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GEOGRAPHICAL LOCATION AS A FACTOR IN HISTORY.*

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The location of a country or people is always the supreme geographical fact in its history. It outweighs every other single geographic force. All that has been said of Russia's vast area, of her steppes and tundra wastes, of her impotent seaboard on land-locked basins or ice-bound coasts, of her poverty of mountains and wealth of rivers, fades into the background before her location on the border of Asia. From her defeat by the Tartar hordes in 1224 to her attack upon the Mongolian rulers of the Bosporus in 1877, and her recent struggle with Japan, most of her wars have been waged against Asiatics. Location made her the bulwark of Central Europe against Asiatic invasion and the apostle of Western civilization to the heart of Asia. If this position on the outskirts of Europe, remote from its great centres of development, has made Russia only partially accessible to European culture and, furthermore, has subjected her to the retarding ethnic and social influences emanating from her Asiatic neighbours, and if the rough tasks imposed by her frontier situation have hampered her progress, these are all the limitations of her geographical location, limitations which not even the advantage of her vast area has been able to outweigh.

Area itself, important as it is, must yield to location. Location may mean only a single spot, and yet from this spot powerful influences may radiate. No one thinks of size when mention is made of Rome or Athens, of Jerusalem or Mecca, of Gibraltar or Port Arthur. Iceland and Greenland guided early Norse ships to the

*Read before the American Historical Association at Madison, Wisconsin, December 28, 1907. From a book in preparation on the Influences of Geographic Environment, based on Ratzel's system of anthropo-geography.

continent of America, as the Canaries and Antilles did those of Spain; but the location of the smaller islands in subtropical latitudes and in the course of the northeast trade-winds made them determine the first permanent path across the Western seas.

The historical significance of many small peoples, and the historical insignificance of many big ones even to the *nil* point, is merely the expression of the preponderant importance of location over area. The Phœnicians, from their narrow strip of coast at the foot of Mount Lebanon, were disseminators of culture over the whole Mediterranean. Holland owed her commercial and maritime supremacy, from the thirteenth to the middle of the seventeenth century, to her exceptional position at the mouth of the great Rhine highway and at the southern angle of the North Sea near the entrance to the unexploited regions of the Baltic. The Iroquois tribes, located where the Mohawk Valley opened a way through the Appalachian barrier between the Hudson River and Lake Ontario, occupied both in the French wars and in the Revolution a strategic position which gave them a power and importance out of all proportion to their numbers.

Location often assumes a fictitious political value, due to a combination of political interests. The Turkish power owes its survival on the soil of Europe to-day wholly to its position on the Bosporus. Holland owes the integrity of her kingdom, and Roumania that of hers, to their respective locations at the mouths of the Rhine and the Danube, because the interest of western Europe demanded that these two important arteries of commerce should be held by powers too weak ever to tie them up. The same principle has guaranteed the neutrality of Switzerland, whose position puts it in control of all the passes of the Central Alps from Savoy to the Tyrol; and, more recently, that of the young state of Panama, through which the Isthmian Canal is to pass.

Geographical location necessarily includes the idea of the size and form of a country. Even the most general statement of the zonal and interoceanic situation of Canada, the United States, Mexico, and the Russian Empire, indicates the area and contour of their territories. This is still more conspicuously the case with naturally defined regions, such as island and peninsula countries. But location includes a complex of yet larger and more potent relations which go with mere attachment to this or that continent, or to one or another side of a continent. Every part of the world gives to its lands and its peoples some of its own qualities; and so

again every part of this part. Arabia, India and Farther India, spurs of the Asiatic land-mass, have had and will always have a radically different ethnic and political history from Greece, Italy and Spain, the corresponding peninsulas of Europe, because the histories of these two groups are bound up in their respective continents. The idea of a European state has a different content from that of an Asiatic, or North American or African state; it includes a different race or combination of races, different social and economic development, different political ideals. Location, therefore, means climate and plant life at one end of the scale, civilization and political status at the other.

This larger conception of location brings a correspondingly larger conception of environment, which affords the solution of many otherwise hopeless problems of anthropo-geography. It is embodied in the law that the influences of a land upon its people spring not only from the physical features of the land itself, but also from a wide circle of lands into which it has been grouped by virtue of its location. Almost every geographical interpretation of the ancient and modern history of Greece has been inadequate, because it has failed sufficiently to emphasize the most essential factor in this history, namely, Greece's location at the threshold of the Orient. This location has given to Greek history a strong Asiatic colour. It comes out in the accessibility of Greece to ancient Oriental civilization and commerce, and is conspicuous in every period from the Argonautic Expedition to the achievement of independence in 1832 and the recent efforts for the liberation of Crete. This outpost location before the Mediterranean portals of the vast and arid plains of southwestern Asia, exposed to every tide of migration or conquest sent out by those hungry lands, had in it always an element of weakness. In comparison with the shadow of Asia, which constantly overhung the Greek people and from 1401 to 1823 enveloped them, only secondary importance can be attributed to their advantageous local conditions as factors in Greek history.

It is a similar intercontinental location in the isthmian region between the Mediterranean on the west and the ancient maritime routes of the Red Sea and Persian Gulf on the east, which gave to Phœnicia the office of middleman between the Orient and Occident, and predestined its conquest, now by the various Asiatic powers of Mesopotamia, now by the Pharaohs of Egypt, now by European Greeks and Romans, now by a succession of Asiatic peoples, till to-day we find it incorporated in the Asiatic-European Empire of

Turkey. Proximity to Africa has closely allied Spain to the southern continent in flora, fauna, and ethnic stock. The long-headed, brunette Mediterranean race occupies the Iberian Peninsula and the Berber territory of northwest Africa.* This unity of race is also reflected in the political union of the two districts for long periods, first under the Carthaginians, then the Romans, who secured Hispania by a victory on African soil, and finally by the Saracens. This same African note in Spanish history recurs to-day in Spain's interest in Morocco and the influence in Moroccan affairs yielded her by France and Germany at the Algeciras convention in 1905.

In distinction to this continental or intercontinental location, anthropo-geography recognizes two other narrower meanings of the term. The innate mobility of the human race, due primarily to the eternal food quest and increase of numbers, leads a people to spread out over a territory till they reach the barriers which nature has set up, or meet the frontiers of other tribes and nations. Their habitat or their specific geographic location is thus defined by natural features of mountain, desert and sea, or by the neighbours whom they are unable to displace, or more often by both.

A people has, therefore, a twofold location, an immediate one, based upon their actual territory, and a mediate or vicinal one, growing out of its relations to the peoples nearest them. The first is a question of the soil under their feet; the other, of the neighbours about them. The first or natural location embodies the complex of local geographic conditions which furnish the basis for their tribal or national existence. This basis may be a peninsula, island, archipelago, an oasis, an arid steppe, a mountain system, or a fertile lowland. The stronger the vicinal location, the more dependent is the people on the neighbouring states, but the more potent the influence which it can, under certain circumstances, exert upon them. Witness Germany in relation to Holland, France, Austria and Poland. The stronger the natural location, on the other hand, the more independent is the people and the more strongly marked is the national character. This is exemplified in the people of mountain lands like Switzerland, Abyssinia and Nepal; of peninsulas like Korea, Spain and Scandinavia; and of islands like England and Japan. To-day we stand amazed at that strong primordial brand of the Japanese character which nothing can blur or erase.

Clearly defined natural locations, in which barriers of moun-

* W. L. Ripley, The Races of Europe, pp. 272–273. New York, 1899.

tains and sea draw the boundaries and guarantee some degree of isolation, tend to hold their people in a calm embrace, to guard them against outside interference and infusion of foreign blood, and thus to make them develop the national genius in such direction as the local geographic conditions permit. In the unceasing movements which have made up most of the historic and prehistoric life of the human race, in their migrations and counter-migrations, their incursions, retreats, and expansions over the face of the earth, vast unfenced areas, like the open lowlands of Russia and the grasslands of Africa, present the picture of a great thoroughfare swept by pressing throngs. Other regions, more secluded, appear as quiet nooks, made for a temporary halt or a permanent rest. Here some part of the passing human tide is caught as in a vessel and held till it crystallizes into a nation. These are the conspicuous areas of race characterization. The development of the various ethnic and political offispring of the Roman Empire in the naturally defined areas of Italy, the Iberian Peninsula, and France illustrates the process of national differentiation which goes on in such secluded locations.

A marked influence in this development is generally ascribed to the protection afforded by such segregated districts. But protection alone is only a negative force in the life of a people; it leaves them free to develop in their own way, but does not say what that way shall be. On the other hand, the fact that such a district embraces a certain number of geographic features, and encompasses them by obstructive boundaries, is of immense historical importance; because this restriction leads to the concentration of the national powers, to the more thorough utilization of natural advantages, both racial and geographical, and thereby to the growth of an historical individuality. Nothing robs the historical process of so much of its greatness or weakens so much its effects as its dispersion over a wide, boundless area. This was the disintegrating force which sapped the strength of the French colonies in America. The endless valleys of the St. Lawrence and the Mississippi and the alluring fur trade tempted them to an expansion that was their political and economic undoing. Russia's history illustrates the curse of a distant horizon. On the other hand, out of a restricted geographical base, with its power to concentrate and intensify the national forces, grew Rome and Greece, England and Japan, ancient Peru and the Thirteen Colonies of America.

If even the most detached and isolated of these natural locations

be examined, its people will, nevertheless, reveal a transitional character, intermediate between those of its neighbours, because from these it has borrowed both ethnic stock and culture. Great Britain is an island, but its vicinal location groups it with the North Sea family of peoples. Even in historic times it has derived ancient Belgian stock, Roman, Anglo-Saxon, Danish and Scandinavian from the long semi-circle of nearby continental lands, which have likewise contributed so much to the civilization of the island. Similarly, Japan traces the sources of its population to the north of Asia by way of the island of Sakhalin, to the west through Korea, and to the Malay district of the south, whence the Kuro Siwa has swept stragglers to the shores of Kiu-siu. Like England, Japan also has drawn its civilization from its neighbours, and then, under the isolating influence of its local environment, has individualized both race and culture. Here we have the interplay of the forces of natural and vicinal location.

A people situated between two other peoples forms an ethnic and cultural link between the two. The transitional type is as familiar in anthropo-geography as in biology. The only exception is found in the young intrusion of a migrating or conquering people, like that of the Hungarians and Turks in southeastern Europe, and of the Berber Touaregs and Foulbes among the negroes of western Soudan; or of a colonizing people, like that of the Russians in Mongolian Siberia and of Europeans among the aborigines of South Africa. Even in these instances race amalgamation tends to take place along the frontiers, as was the case in Latin America and as occurs to-day in Alaska and northern Canada, where the "squaw man" is no rarity. The assimilation of culture, at least in a superficial sense, may be yet more rapid, especially where hard climatic conditions force the interloper to imitate the life of the native. The industrial and commercial Hollander, when transplanted to the dry grasslands of South Africa, became pastoral like the native Kaffirs. The French voyageur of Canada could scarcely be distinguished from the Indian trapper; occupation, food, dress, and spouse were the same. Only a lighter tint of skin distinguished the half-breed children of the Frenchman. The settlers of the early trans-Allegheny commonwealths, at least for a generation or two, showed little outward difference in mode of life from that of the savage community among which they dwelt.*

The more alike the components of such a vicinal group of people,

*Monette, History of the Valley of the Mississippi, Vol. II, Chap. I, 1846.

the easier, freer and more effective will be the mediating function of the central one. Germany has demonstrated this in her long history as intermediary between the nations of southeastern and western Europe. The kingdom of Poland, occupying a portion of the Baltic slope of northern Europe, fended by no natural barriers from its eastern and western neighbours, long constituted a transition form between the two. Though affiliated with Russia in point of language, the Poles are Occidental in their religion; and their headform resembles that of northern Germany rather than that of Russia.* The country belongs to western Europe in the density of its population (74 to the square kilometre or 190 to the square mile), which is quadruple that of remaining European Russia, and also in its industrial and social development. The partition of Poland among the three neighbouring powers was the final expression of its intermediate location and character. One part was joined politically to the Slav-German western border of Russia, and another, to the German-Slav border of Germany, while the portion that fell to the Austrian Empire simply extended the northern Slav area of that country found in Bohemia and Moravia.

If the intermediate people greatly differs in race or civilization from both neighbours, it exercises and receives slight influence. The Mongols of Central Asia, between China on one side and Persia and India on the other, have been poor vehicles for the exchange of culture between these two great districts. The Hungarians, located between the Roumanians and Germans on the east and west, Slovaks and Croatians on the north and south, have helped little to reconcile race differences in the great empire of the Danube.

The unifying effect of vicinal location is greatly enhanced if the neighbouring people are grouped about an enclosed sea which affords an easy highway for communication. The integrating force of such a basin will often overcome the disintegrating force of race antagonisms. The Roman Empire in the Mediterranean was able to evolve an effective centralized government and to spread one culture over the neighbouring shores, despite great variety of nationality and language and every degree of cultural development. A certain similarity of natural conditions, climatic and otherwise, from the Iberian peninsula to the borders of the Syrian desert, also aided in the process of amalgamation.

Where similarity of race already forms a basis for congeniality, such circumthalassic groups display the highest degree of interactive

*W. L. Ripley, Races of Europe, p. 336, map p. 53. New York, 1899.

influence. These contribute to a further blending of population and unification of culture, by which the whole circle of the enclosing lands tends to approach one standard of civilization. This was the history of the Baltic coast from the thirteenth to the sixteenth centuries, when the German Hansa distributed the material products of Europe's highest civilization from Russian Novgorod to Norway. The North Sea group, first under the leadership of Holland, later under England's guidance, became a single community of advancing culture, which was a later reflection of the early community of race stretching from the Faroe and Shetland Islands to the Rhine and the Elbe. This same process has been going on for ages about the marginal basins of eastern Asia, the Yellow and Japan Seas. Community of race and culture stamps China, Korea and Japan. A general advance in civilization under the leadership of Japan, the England of the East, now inaugurates the elevation of the whole group.

An even closer connection exists between adjoining nations who are united by ties of blood and are further made economically dependent upon one another, because of a contrast in the physical conditions and, therefore, in the products of their respective territories. Numerous coast and inland tribes, pastoral and agricultural tribes are united because they are mutually necessary. In British Columbia and Alaska the fishing Indians of the seaboard long held a definite commercial relation to the hunting tribes of the interior, selling them the products and wares of the coast, while monopolizing their market for the inland furs. Such was the position of the Ugalentz tribe of Tlingits near the mouth of the Copper River in relation to the up-stream Athapascans; of the Kinik tribe at the head of Cook's Inlet in relation to the inland Atnas;* of the Chilcats of Chilkoot Inlet to the mountain Tinnehs. Similarly, the hunting folk of the Kalahari Desert in South Africa attach themselves to influential tribesmen of the adjacent Bechuana grasslands, in order to exchange the skins of the desert animals for spears, knives, and tobacco†. Fertile agricultural lands adjoining pastoral regions of deserts and steppes have in all times drawn to their border markets the mounted plainsmen, bringing the products of their herds to exchange for grain; and in all times the abundance of their green fields has lured their ill-fed neighbours to conquest, so that the economic bond becomes only a preliminary to a political

* Eleventh Census Report for Alaska, pp. 66, 67, 70. Washington, 1893.
† David Livingstone, Travels in South Africa, p. 56. New York, 1858.

bond and an ethnic amalgamation growing out of this strong vicinal location. The forest lands of Great Russia supplement the grain-bearing Black Lands of Little Russia; the two are united through geographico-economic conditions, which would not permit an independent existence to the smaller, weaker section of the south, ever open to hostile invasion from Asia.*

Leaving now the ethnic and economic ties which may strengthen the cohesive power of such vicinal grouping, and considering only its purely geographic aspects, we distinguish the following types:

I. Central location. Examples: The Magyars in the Danube Valley; the Iroquois Indians on the Mohawk River and the Finger Lakes; Russia from the 10th to the 18th century; Poland from 1000 to its final partition in 1795; Bolivia.

II. Peripheral location: The Phœnicians; Greek colonies in Asia Minor and southern Italy; the Roman Empire at the accession of Augustus; the Thirteen Colonies in 1750.

III. Scattered location: English and French settlements in America prior to 1700; Chinese in the Malay Archipelago; Indians in the United States and the Kaffirs in South Africa; Portuguese holdings in the Orient, and French in India.

IV. Location in a related series: Oasis states grouped along desert routes; islands along great marine routes.

All peoples in their geographical distribution tend to follow a social and political law of gravitation, in accordance with which members of the same tribe or race gather around a common centre or occupy a continuous stretch of territory, as compactly as their own economic status and the physical conditions of climate and soil will permit. This is characteristic of all mature and historically significant peoples who have risen to sedentary life, maintained their hold on a given territory, and, with increase of population, have widened their boundaries. The nucleus of such a people may be situated somewhere in the interior of a continent, and with growing strength it may expand in every direction; or it may originate on some advantageous inlet of the sea and spread thence up and down the coast, till the people have possessed themselves of a long-drawn hem of land and used this peripheral location to intercept the trade between their back country and the sea.

These are the two types of continuous location. In contrast to them, a discontinuous or scattered location characterizes the sparse distribution of primitive hunting and pastoral tribes; or the shattered

* Anatole Leroy-Beaulieu, The Empire of the Tsars, Vol. I, pp. 36, 108. New York, 1893.

fragments of a conquered people, whose territory has been honeycombed by the land appropriation of the victors; or of a declining, moribund people, who, owing to bad government, poor economic methods, and excessive competition in the struggle for existence, have shrunk to mere patches. As a favorable symptom, a scattered location regularly marks the healthy growth of an expanding people, who throw out here and there detached centres of settlement far beyond the compact frontier and fix these as the goal for the advance of their boundary; and it is also a familiar feature of maritime commercial expansion, which is guided by no territorial ambition but aims to secure merely widely distributed trading stations at favorable coast points, in order to make the circle of commerce as ample and resourceful as possible. But this latter form of scattered location is not permanently sound. Back of it lies the short-sighted policy of the middleman nation, which makes wholly inadequate estimate of the value of land, and is content with an ephemeral prosperity.

A broad territorial base and security of possession are the guarantees of national survival. The geographic conditions which favor one often operate against the other. Peripheral location means a narrow base but a protected frontier along the sea; central location means opportunity for widening the territory, but it also means danger. A state embedded in the heart of a continent has, if strong, every prospect of radial expansion and of the exercise of widespread influence; but if weak, its very existence is imperilled, because it is exposed to encroachments on every side. A central location minus the bulwark of natural boundaries enabled the kingdom of Poland to be devoured piecemeal by its voracious neighbours. The kingdom of Burgundy, always a state of fluctuating boundaries and shifting allegiances, fell at last a victim to its central location, and saw its name obliterated from the map. Hungary, which, in the year 1000, occupied a restricted inland location on the middle Danube, by the 14th century broke through the barriers of its close-hugging neighbours, and stretched its boundaries from the Adriatic to the Euxine; two hundred years later its territory contracted to a fragment before the encroachments of the Turks, but afterwards recovered in part its old dimensions. Germany has, in common with the little Soudanese state of Bornu, an influential and dangerous position. The location of the Central European states between the Baltic and the Balkans has exposed them to all the limitations and dangers arising from a narrow circle of land neighbours. Moreover,

the diversified character of the country, its complex mountain systems, and diverging river courses have acted as disintegrating forces which have prevented the political concentration necessary to repel interference from without. The Muscovite power, which had its beginning in a modest central location about the sources of the Dwina, Dnieper and Volga, was aided by the physical unity of its unobstructed plains, which facilitated political combination. Hence, on every side it burst through its encompassing neighbours and stretched its boundaries to the untenanted frontier of the sea. Central location was the undoing of the Transvaal Republic. Its efforts to expand to the Indian Ocean were blocked by its powerful British neighbour at every point—at Delagoa Bay in 1875 by treaty with Portugal, at Santa Lucia Bay in 1884, and through Swaziland in 1894. The Orange Free State was maimed in the same way when, in 1868, she tried to stretch out an arm through Basutoland to the sea.* Here even weak neighbours were effective to curtail the seaward growth of these inland states, because they were made the tools of one strong, rapacious neighbour. A central position teaches always the lesson of vigilance and preparedness for hostilities, as the Boer equipment in 1899, the military organization of Germany, and the bristling fortesses on the Swiss Alpine passes prove.

How intimate and necessary are the relations between central and peripheral location is shown by the fact that all states strive to combine the two. In countries like Norway, France, Spain, Japan, Korea and Chile, the peripheral location predominates, and therefore confers upon them at once the security and commercial accessibility which result from contact with the sea. Other countries, like Russia, Germany and Austro-Hungary, chiefly central in location, have the strategic and even the commercial value of their coasts reduced by the long, tortuous course which connects them with the open ocean. Therefore, we find Russia planning to make a great port at Ekaterina Harbor on the northernmost point of her Lapland coast, where an out-runner from the Gulf Stream ensures an ice-free port on the open sea.† An admirable combination of central and peripheral location is seen in the United States. Here the value of periphery is greatly enhanced by the interoceanic location of the country, and the danger of entanglements arising from a marked central location is reduced by the simplicity of the political neighbourhood. But our country has paid for this security by an historical

* James Bryce, Impressions of South Africa, pp. 147, 150, 170–173. New York, 1897.

† Alexander P. Engelhardt, A Russian Province of the North, pp. 135, 140–147, 165, 170. Translated from the Russian, London, 1899.

aloofness and poverty of influence. Civilized countries which are wholly central in their location are very few, only nine in all. Six of these are mountain or plateau states, like Switzerland and Abyssinia, which have used the fortress character of their land to resist conquest, and have preferred independence to the commercial advantages to be gained only by affiliation with their peripheral neighbours.

Central and peripheral location presuppose and supplement one another. One people inhabits the interior of an island or continent whose rim is occupied by another. The first suffers from exclusion from the sea and therefore strives to get a strip of coast. The coast people feel the drawback of their narrow hold upon the land, want a broader base in order to exploit fully the advantages of their maritime location, fear the pressure of their hinterland when the great forces there imprisoned shall begin to move; so they tend to expand inland to strengthen themselves and weaken the neighbour in their rear. The English colonies of America, prior to 1763, held a long cordon of coast, hemmed in between the Appalachian Mountains and the sea. Alarmed by threats of French encroachments from the interior, they expanded from this narrow peripheral base into the heart of the continent, and after the Revolution reached the Mississippi River and the northern boundaries of the Spanish Floridas. They now held a central location in relation to the long Spanish periphery on the Gulf of Mexico. True to the instincts of that location, they began to throw the weight of their vast hinterland against the weak coastal barrier. This gave way, either to forcible appropriation of territory or diplomacy or war, till the United States had incorporated in her own territory the peripheral lands of the Gulf from Florida Strait to the Rio Grande.

In Asia this same process has been perennial and on a far greater scale. The big arid core of that continent, containing many million square miles, has been charged with an expansive force. From the appearance of the Aryans in the Indus Valley and the Scythians on the borders of Macedonia, it has sent out hordes to overwhelm the peripheral lands from the Yellow Sea to the Black, and from the Indian Ocean to the White Sea.* To-day Russia is making history there on the pattern set by geographic conditions. From her most southerly province in Trans-Caspia, conquered a short twenty-five years ago, she is heading towards the Indian Ocean. The Anglo-Russian convention of August 31st, 1907, yielding to Russia all

* For full and able discussion, see H. J. Mackinder, The Geographical Pivot of History, in the Geographical Journal, April, 1904. London.

northern Persia as her sphere of influence, enables her to advance half way to the Persian Gulf, though British statesmen regard it as a check upon her ambition, because England has secured her claim to the littoral. But Russia by this great stride towards her goal is working with causes, satisfied to let the effects follow at their leisure. She has gained the best portion of Persia, comprising the six largest cities and the most important lines of communication radiating from the capital.* This country will make a solid base for her further advance to the Persian Gulf; and, when developed by Russian enterprise in railroad building and commerce, it will make a heavy weight bearing down upon the coast. The ponderous mass which is pressing down on England's Persian littoral reaches from Ispahan and Yezd to the far-away shores of the Arctic Ocean.

In the essentially complementary character of interior and periphery are rooted all these coastward and landward movements of expansion. Where an equilibrium seems to have been reached, the peoples who have accepted either the one or the other one-sided location have generally for the time being ceased to grow. Such a location has therefore a passive character. But the surprising elasticity of many nations may start up an unexpected activity which will upset this equilibrium. Where the central location is that of a small mountain community, like the Romansch people in the Graubünden Alps or the Igorots in the highland interior of Luzon, or the Veddas of central Ceylon, the passive character is plain enough. In the case of larger groups occupying a central location, it is often difficult to say whether progression or retrogression is to be their fate. As a rule, however, the expulsion of a people from a peripheral point of advantage and their confinement in the interior gives the sign of national decay, as did Poland's loss of her Baltic seaboard. Russia's loss of her Manchurian port and the resignation of her ambition on the Chinese coasts is at least a serious check. On the other hand, if a country enclosed by her neighbours succeeds in somewhere making a breach in the fence, the sign is hopeful. The century-old political slogan of Hungary, "To the sea, Magyars!" has borne fruit in the Adriatic harbor of Fiume, which is to-day the pride of the nation and in no small degree a basis for its hope of autonomy. The history of Montenegro took on a new phase when from its mountain seclusion it recently secured the short strip of seaboard which it had won and lost so often. Such peripheral holdings are the lungs through which states breathe.

* The Anglo-Russian Agreement, with map, in The Independent, October 10, 1907.

History and the study of race distribution reveal a mass of facts which represent the reaction between interior and periphery. Especially the story of discovery and colonization, from the days of ancient Greek enterprise in the Mediterranean to the recent German expansion along the Gulf of Guinea, shows the appropriation first of the rims of islands and continents, and later that of the interior. A difference of race and culture between inland and peripheral inhabitants meets us almost everywhere in the more retarded lands of the earth. In the Philippines, the wild people of Luzon, Mindoro and the Visayas are confined almost entirely to the interior, while civilized or Christianized Malays occupy the whole seaboard, except where the rugged Sierra Madre Mountains, fronting the Pacific in Luzon, harbor a sparse population of primitive Negritos.* For centuries Arabs held the coast of East Africa, where their narrow zone of settlement bordered on that of native blacks, with whom they traded. Even ancient Greece showed a wide difference in type of character and culture between the inland and maritime states. The Greek landsman was courageous and steadfast, but crude, illiterate, unenterprising, showing sterility of imagination and intellect; while his brother of the seaboard was active, daring, mercurial, imaginative, open to all the influences of a refining civilization.† Today the distribution of the Greeks along the rim of the Balkan peninsula and Asia Minor, in contrast to the Turks and Slavs of the interior, is distinctly a peripheral phenomenon.‡

The rapid inland advance from the coast of oversea colonists is part of that restless activity which is fostered by contact with the sea and supported by that command of abundant resources conferred by maritime superiority. The Anglo-Saxon invasion of England, as later the English colonization of America, seized the rim of the land, and promptly pushed up the rivers in sea-going boats far into the interior. But periphery may give to central region something more than conquerors and colonists. From its active markets and cosmopolitan exchanges there steadily filter into the interior culture and commodities, carried by peaceful merchant and missionary, who, however, are often only the harbingers of the conqueror. The accessibility of the periphery tends to raise it in culture, wealth, density of population, and often in political importance, far in advance of the centre.

The maritime periphery of a country receives a variety of over-

* Census of the Philippine Islands of 1903, Vol. I, p. 526; Vol. II, pp. 50–52 and map. Washington.
† Grote, History of Greece, Vol. II, pp. 225–226. New York, 1859.
‡ W. L. Ripley, The Races of Europe, pp. 402–410, map. New York, 1899.

sea influences, blends and assimilates these to its own culture, Hellenizes, Americanizes or Japanizes them, as the case may be, and then passes them on into the interior. Here no one foreign influence prevails. On the land boundaries the case is different. Each inland frontier has to reckon with a different neighbour and its undiluted influence. A predominant central location means a succession of such neighbours, on all sides friction which may polish or rub sore. The distinction between a many-sided and a one-sided historical development depends upon the contact of a people with its neighbours. Consider the multiplicity of influences which have flowed in upon Austria from all sides. But not all such influences are similar in kind or in degree. The most powerful neighbour will chiefly determine on which boundary of a country its dominant historical processes are to work themselves out in a given epoch. Therefore, it is of supreme importance to the character of a people's history on which side this most powerful neighbour is located. Russia had for several centuries such a neighbour in the Tartar hordes along its southeastern frontier, and, therefore, its history received an Asiatic stamp; so, too, did that of Austria and Hungary in the long resistance to Turkish invasion. All three states suffered in consequence a retardation of development on their western sides. This appeared later, after the turmoil on the Asiatic frontier had subsided, and the great centres of European culture and commerce beyond the Vistula and the March began to assert their powers of attraction. The young Roman Republic drew up its forces to face the threatening power of Carthage in the south, and thereby was forced into rapid maritime development; the Roman Empire faced north to meet the inroads of the barbarians, and thereby was drawn into inland expansion. All these instances show that a vital historical turning-point is reached in the development of every country when the scene of its great historical happenings shifts from one side to another.

In addition to the aggressive neighbour, there is often a more sustained force that may draw the activities of a people toward one or another boundary of their territory. This may be the abundance of land and unexploited resources lying on a colonial frontier and attracting the unemployed energies of the people, such as existed till recently in the United States,* and such as is now transferring the most active scenes of Russian history to far-away Siberia. But a

* Frederick J. Turner, The Significance of the Frontier in American History, in the Annual Report of the American Historical Association for 1893, pp. 199–227. Washington, 1894.

stronger attraction is that of a higher civilization and dominant economic interests. So long as the known world was confined to the temperate regions of Europe, Asia and Africa, together with the tropical districts of the Indian Ocean, the necessities of trade between Orient and Occident and the historical prestige of the lands bordering on the Mediterranean placed in this basin the centre of gravity of the cultural, commercial and political life of Europe. The continent was dominated by its Asiatic corner, its every country took on an historical significance proportionate to its proximity and accessibility to this centre. The Papacy was a Mediterranean power. The Crusades were Mediterranean wars. Athens, Rome, Constantinople, Venice, and Genoa held in turn the focal positions in this Asiatic-European sea; they were on the sunny side of the continent, while Portugal and England lay in shadow. Only that portion of Britain facing France felt the cultural influences of the southern lands. The estuaries of the Mersey and Clyde were marshy solitudes, echoing to the cry of the bittern and the ripple of Celtic fishing-boat.

After the year 1492 inaugurated the Atlantic period of history, the western front of Europe superseded the Mediterranean side in the historical leadership of the continent. The Breton coast of France waked up, the southern seaboard dozed. The old centres in the Ægean and Adriatic became drowsy corners. The busy traffic of the Mediterranean was transferred to the open ocean, where, from Trafalgar to Norway, the western states of Europe held the choice location on the world's new highway. Liverpool, Hamburg, Rotterdam, Cherbourg and Cadiz were shifted from shadowy margin to illuminated centre. Every country of Europe felt the effect. The experience of Germany was typical of the change. From the 10th to the middle of the 16th century, this heir of the old Roman Empire was drawn towards Italy by every tie of culture, commerce and political ideal. This concentration of interest on its southern neighbour made it ignore a fact so important as the maritime development of its Hanse Towns, wherein lay the real promise of its future. The shifting of its historical centre of gravity to the Atlantic seaboard, where it now lies, came very late, retarded further by lack of national unity.

Location, therefore, while being the most important single geographic factor in history, is at the same time the one most subject to the vicissitudes attending the anthropo-geographical evolution of the earth. Its value changes with the transfer of the seats of the highest civilizations from tropical to temperate lands; from the

margin of small, enclosed seas to the hem of the world ocean; from small, naturally defined territories to large, elastic areas; from mere periphery to a combination of periphery and centre, commanding the freedom of the sea and the abundant resources of a large hinterland.

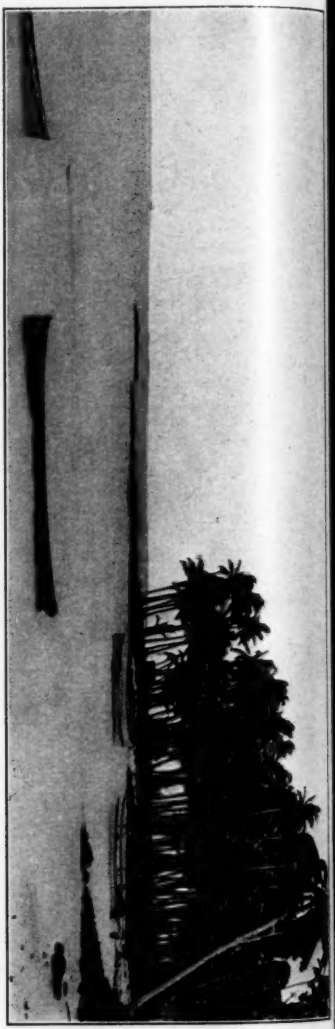
LAVA FLOWING INTO THE OCEAN.

After the volcanic outbreak of 1905-06 in Savaii Island of the Samoan group the Linnean Society of New South Wales gave to Mr. H. I. Jensen, Linnean Macleay Fellow of the Society in Geology, leave of absence to carry out investigations of these latest phenomena on the island. His report is published in the *Proceedings* of the Society for 1906 (No. 124, issued March 28, 1907). Some facts from Mr. Jensen's report are presented here, together with two of his photographs showing the building of a lava peninsula in the ocean (1) in the early stage of the work and (2) a few weeks later.

The flow of 1905-06 occurred in the northeastern part of the island and came from a new crater which formed a couple of miles to the north of Mt. Pule (crater lake) on the mountain slopes. The new crater is seven or eight miles from the sea in the shortest direction, but the lava, following a circuitous course, runs an even greater distance before reaching the sea. The new volcano attained an altitude of 2,000 feet. South and east of its crater are remnants of older craters, and north of it are a couple of small cones, about a thousand feet high, which have perfect craters and are composed of lava cinders.

The quantity of lava which emerged from the new volcano covered an area of about thirty square miles and flowed from the vent in a northeasterly direction. The thickness of this lava varies greatly, depending on the proximity to the volcano and the previous configuration of the country. Originally a deep valley reached almost to the present site of the active cone. The earlier flows followed this valley, and in it, for a distance of several miles, there is now a thickness of lava exceeding a thousand feet.

What was a deep valley only a few hundred feet above sea level now forms a huge bulging lava ridge above 1,500 feet high near the volcano and sloping gently towards the sea. This inclined lava plain was still rising when Mr. Jensen saw it, through the intercalation



LAVA PENINSULA BEGINS BUILDING.

LAVA PENINSULA, A FEW WEEKS LATER.

of new lava sheets under the cooler crust. The captain of the steamer *Maori,* who periodically visits the island, told Mr. Jensen that he could see an appreciable difference in the altitude of this ridge at each trip.

When Mr. Jensen was there most of the lava exuded at that time was moving to the sea, following definite lava tunnels beneath the cooled crust. The course of these tunnels could be traced by vent holes through which steam and sulphurous gases were rising. Where the lava was flowing into the sea there seemed to be miniature volcanoes due to explosions that occurred about every two minutes. The cause of these explosions seemed to be that as the lava poured into the ocean a considerable amount of water was included in and beneath it. This water was converted into steam, and when the steam pressure became great enough an explosion took place. The water entered the sea along a width of several miles, so that a continuous wall of steam lined the coast. The sea was in ebullition for several hundred yards out. Enormous quantities of coral and fishes were killed. Lava has filled the water area between the shore and the coral reef and has also built a peninsula several miles in length.

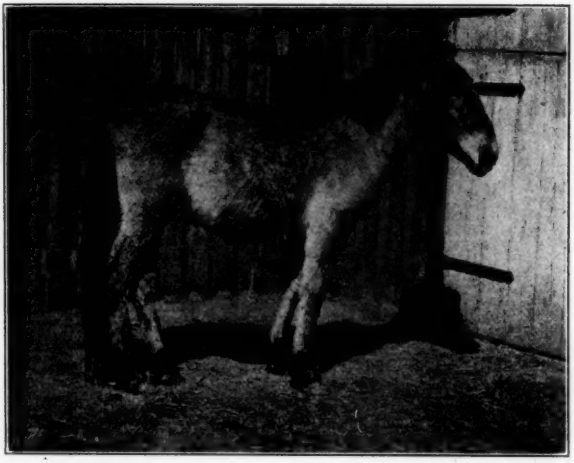
It is impossible to estimate the weight of the lava, but it is certain that its volume exceeds a cubic mile and that three cubic miles may not be too high an estimate. The flow over a considerable area exceeds 1,000 feet in thickness. Over the coastal area from Saleaula to Satapatu and inland three or four miles its thickness varies from twenty to several hundred feet. Between Asuisui and Satapatu it has flowed into deep water and filled up the sea bottom to such an extent as to make the water greenish for nearly a mile out from the shore.

PRJEVALSKY'S HORSE.

The English translation of the account of this wild horse, written in Russian by Dr. W. Salensky, has recently appeared from the press of Hurst & Blackett, London. Some thirty years ago the Russian explorer Prjevalsky reported that he had discovered a new and quite distinct type of horse in the Gobi Desert, to the west of Mongolia. Most British naturalists did not regard the Prjevalsky horse as a valid species of the wild horse, some thinking it a kiang hybrid and others the offspring of escaped Mongol ponies.

A herd of about thirty living specimens reached Europe in 1902, most of them being now in Russia, though a few are in England. Dr. Salensky, by studying the external characters, teeth and skeleton, arrived at the conclusion that the Prjevalsky horse is a species or race of the genus *Equus* and that it "is of extraordinary interest since in it the characters of the domestic horse are mixed with features reminding one of the Asiatic ass."

The animal belongs to the steppe variety of wild horse, but for lack of data it is not possible yet to determine what relationship exists between this wild horse and domestic horses. It is impossible



THE PRJEVALSKY WILD HORSE.

to say, with our present knowledge, whether it gave origin to any of the ancestors of the domestic horse.

The book gives a detailed account of the physical characteristics of the animal. Its area of distribution is confined to a rectangular district, bounded on the north by 48° and on the south by 46° N. Lat., on the west by 84° and on the east by 90°-91° E. Long. Observations of the animal in the wild state show that it is an inhabitant of the level districts and goes at night to the pasture lands and drinking places. At break of day it returns to the desert, where it rests until sunset. In the spring, when there are foals in the herd, the animals always rest in the same place, but as the foals grow up the resting place is frequently changed. The animals generally walk

one behind another, and their deeply trodden paths are found all over the district. The Mongolians have tried to tame them, but, on the whole, they will not submit to man, are afraid of him and cannot be rendered serviceable. No progress has been made in the efforts to tame the captives now in Europe.

The capture of the horse, as practiced by the Mongolians, is a very simple affair. At the time when the mares foal, the Kalmuks betake themselves to the plains with two horses. They follow a herd until the still weak foals can go no farther. The foals are then caught and reared in a herd of domestic horses. Some facts are known which indicate that there may yet be hope of taming these animals. Mr. P. K. Koslov, for instance, saw a six-month foal belonging to the Van of Ljukschin, which had been so far tamed as to go well in a bridle and mount with ease a stairway leading to the second floor, and also to allow the seven year old son of the Van to sit on its back.

INFORMATION FROM MR. LEFFINGWELL.

Advices from Mr. Leffingwell, of the Mikkelsen-Leffingwell Polar Expedition, give interesting particulars of his personal experiences and of his plans for work during the coming season.

He early formed a favourable opinion of the helpfulness of the Eskimos. Flaxman Island proved to be very desirable as winter headquarters, especially as two native families lived there from whom the expedition could procure game and furs. They helped the party in many ways, and one of the men gave up his whole year to the visitors, hunting seal for the dog-feed all winter, even in the worst of weather.

A white man named Arey, who had been in the country for twenty years, and knew the coast thoroughly, was also of great assistance. Mr. Arey, a mining prospector, convinced the party that a white man may live very comfortably in that Arctic country if he only knows how. Arey has an Eskimo wife, two sons, 17 and 15 years old, and two other children, 6 and 3 years old. He and his boys made a hunting trip for caribou and brought in a sled load. The exploring party thus lived on the fat of the land.

Persons who have never been in cold climates do not understand what drifting snow is. During high winds, the air was often so thick with flying snow that Leffingwell and his comrades could not see a black object thirty yards away. There were many gales

during the winter, when they could see only the topmast of their vessel from the shore, about 60 yards away. Mr. Leffingwell mentions the following incident to illustrate the extraordinary force of these high winds:

An Eskimo girl, a few years ago, went from the cabin on Flaxman Island to the cache, not over 100 feet away, to get something needed in the house. She did not return and a man went out to find her. He also failed to return. After the gale had subsided the girl came in, but the man was found only when the snow that buried him melted in the spring. The girl found that she could make no headway towards the house against the gale; so she sat down with her back to the wind, drew her arms inside of her fur shirt next to the skin, and sat there nearly buried in snow till the gale ceased.

Among the advantages of fur clothing is the fact that a person wearing it may sleep out of doors without freezing. A good hunter will chase caribou all day without food, sleep in the open air, even for two nights, if necessary, and return to camp as well as he left it. A man can keep warm in woollen clothing as long as he is on the move, but if he stops, the cold is felt.

There is no need to face unpleasant weather if travellers have plenty of leisure. On trips, the party learned to take an ample supply of food, so that they might remain quietly in camp when they were inclined to do so. A properly made camp is as comfortable and safe as a house, though, of course, smaller. The tent used by natives and experienced white men is made by sticking bent poles into the snow and lashing the tops so as to form a hemisphere. Over this is thrown a caribou skin, hair side out, and cotton drilling over that to keep the snow out of the hair. If one does not possess a skin tent, two covers of drilling are used, the air space between making it many times warmer than one thickness of the heaviest canvas. The floor is covered with skin and the stove is set up in one corner. Then the occupants are ready to defy the worst that may come. The tent is about three and a half feet high, and round, so that the wind gets no hold on it. It is sometimes necessary to put a few slabs of snow on the weather side and to build a snow passageway in front of the door, and this work may be done with a saw or snow knife in a few minutes. Water does not freeze in a skin tent, except in the severest weather. Even in a double drill tent no frost from the breath forms upon the clothing, and scarcely any upon the wall of the tent.

In one of his trips Mr. Leffingwell went, with Arey and his oldest boy, to the mountains, south of the coast. They ascended the Ookpelia River, sledding nearly to the mountains and then packing the rest of the way. The man had fifty pounds on his back, and four dogs carried about forty pounds apiece. They were among the mountains about six weeks, but the mud, rain, snow and fog prevented Leffingwell from doing much exploration. Arey's son shot two caribou and six mountain sheep. About fifty mountain sheep were seen one day. Early in July the party packed back to the coast, 50 miles, in four days.

This spring Mr. Leffingwell expects to engage in inland exploration with native assistants. At least five rivers coming down to the sea from the mountains are not indicated upon the map. Only one of them had been seen by a white man before last year. The Ookpelia, which Leffingwell explored last year, had never been seen before. He hoped to penetrate the other rivers during the winter and to map the coast from Demarcation Point to the Colville River with as much accuracy and detail as possible. This will be a part of his summer work, and there will be plenty to do, because three or four other rivers have been placed on the map upon native information and have not yet been explored. He hopes to spend June and July studying the geology of the mountains before navigation opens along the coast. He will then endeavour to survey a part of the coast line.

ASSOCIATION OF AMERICAN GEOGRAPHERS.

The Association of American Geographers held its fourth annual meeting at Chicago, December 30th, 1907, and January 1 and 2, 1908. The sessions were held in the Walker Museum of the University of Chicago. Twenty members were in attendance and forty-four papers were presented, this number of papers being larger than at any former meeting. The general attendance, which ranged from 35 to 75, also exceeded that of any former occasion.

The recent death of the Society's President, Dr. Angelo Heilprin, was felt by all to be an irretrievable loss. A memorial and sketch of his life were prepared and read by Professor Davis. The ill-health of Professor A. P. Brigham also deprived the Society of the presence of its Secretary and Treasurer. Until one month earlier Professor Brigham hoped to continue his professorial work in Col-

gate University until the new year, but the effects of long-continued overwork compelled him suddenly to stop. He went at once to Geneva, Switzerland. The greetings of the Society were cabled to him from the banquet on New Year's eve. The duties of both President and Secretary in providing for the Chicago meeting fell upon the first Vice-president, Professor Tarr, to whom the Society is much indebted for their very efficient discharge.

In the three days' session of the Society, the following papers were presented:

PAPERS.

Isaiah Bowman. Geographic Relations in Chile and Bolivia. Evening Lecture, Monday, Dec. 30, 8 o'clock. (Illustrated.)

W. M. Davis. Memorial of Angelo Heilprin, President of the Association, whose death has occurred during the year.

G. W. Littlehales. The American Bathymetrical Chart of the World. By Title.

L. A. Bauer. The Oceanic Magnetic Survey of the Carnegie Institution of Washington. By Title.

Robert De C. Ward. Kassner's Meteorological Globes. By Title.

A. Lawrence Rotch. Meteorological Conditions at Great Heights above the American Continent as Revealed by Registration Balloons Recently Dispatched from St. Louis. (Illustrated.) By Title.

Mark S. W. Jefferson. Rainfall of the Upper Great Lakes.

Eugene Van Cleef. Is there a Type Cyclonic Storm?

J. Paul Goode. An Electrical Compensator for the Foucault Pendulum.

Wallace Craig. (Introduced by Chas. C. Adams.) The Flatness, Aridity and Severe Winter of North Dakota in relation to the Life of the Region.

Henry C. Cowles. The Relation of Snow and Ice to Mountain Timber Lines. (Illustrated.)

E. N. Transeau. The Successional Relations of Cold Spring Harbor Vegetation.

Victor E. Shelford. The Distribution of the Tiger Beetle, and its Relation to Plant Succession. (Illustrated.) Presented in outline by H. C. Cowles.

Charles R. Dryer. Philosophical Geography.

Mark S. W. Jefferson. The Distribution of Population over the Earth.

Edward L. Stevenson. Real and Imaginary Geographical Conditions as Determining Factors in Early Discovery and Exploration in the New World.

C. W. Hall. The Conservation of the Upper Mississippi River.

Collier Cobb. Atlantic Deeper Waterways. (Illustrated.) By Title.

Miss Ellen Churchill Semple. Oceans and Enclosed Seas: a Study in Anthropo-geography.

F. V. Emerson. The Geographic Distribution of Slavery in Missouri. Presented in outline by C. F. Marbut.

R. H. Whitbeck. Geographical Influences in the Development of New Jersey.

Charles R. Dryer. Glacial Economics and Sociology: a Study of a Western New York Town.

Frank Carney. Springs as a Geographic Control in Humid Climates.

Lawrence Martin. Glacial Highways in Alaska. (Illustrated.)

V. Stefansson. Suitability of Eskimo Methods of Winter Travel in Scientific Exploration. By Title.

W. M. Davis. Geography of Devonshire and Cornwall, England.

R. S. Tarr. The Scottish Highlands. (Illustrated.)

Wm. H. Hobbs. On the Expansion and Contraction of the Ground During Earthquakes. (Illustrated.)

S. Wiedman. The Physiography of Northern Wisconsin.

Lawrence Martin. Physiography of the Lake Superior Region.

G. E. Condra. An Outline of the Geography of the Great Plains Region. (Illustrated.)

George A. Loveland. Hot Winds, Their Causes and Consequences. Presented in Outline by G. E. Condra.

G. E. Condra. The Geography of the Sand Hills Area of the Great Plains.

Alvin Keyser. Examples Showing the Physiographic Control of Agriculture in Western Nebraska and Eastern Colorado.

N. A. Bengston. Recent Changes of the Missouri River and Their Consequences.

C. F. Marbut. Soils of the Ozark Region in Missouri.

Wallace W. Atwood. The Lakes and Cirques of the Uinta Mountains.

François E. Matthès. The Cliffs of the Yosemite Valley. By Title.

N. M. Fenneman. Some Features of Erosion without Valleys.
Douglas Wilson Johnson. College Entrance Examinations in Physiography and Geography. By Title.
J. Paul Goode. A College Course in Ontography.
Frank Carney. State Geological Surveys and Practical Geography.
W. M. Davis. Practical Exercises in Physical Geography.
R. S. Tarr. The Use of the Wet Laboratory in the Teaching of Physiography.
Cyrus C. Adams. How May the Association Help to Facilitate Acquaintance With the Best Products of Cartography?
W. M. Davis. Round Table Conference, Tuesday Afternoon, Dec. 31. Uniformity of Method in Geographical Investigation and Instruction.

A Round Table Conference, led by Professor Davis, on the subject of Uniformity of Method in Geographical Investigation and Instruction, elicited much interest. The eleven propositions laid before the conference involved the recognition of (a) Systematic Geography, in which all geographical elements are classified, discussed and described according to kind, and (b) Regional Geography, in which areas are described with reference to these elements. In Systematic Physical Geography forms may best be described in terms of structure, process and stage. The discussion turned chiefly on the question: Can the surface of a given area be adequately described by the technical terms of Systematic Physical Geography without the employment of empirical descriptions? It was recognized that the answer to this question must determine to a very considerable extent the aim and spirit of the science. No conclusions were formulated, but the interest was such that a consensus of opinion will probably be obtained and a statement formulated by subsequent correspondence.

The Society's annual dinner was given at the Quadrangle Club on New Year's Eve. Twenty-five persons were present and matters of general policy were discussed. Professors Wilcox and Burr, of Cornell University, who were guests of the Society, spoke of geographical scholarship from their several standpoints. The former, who has long been connected with the Census Bureau, is making efforts in a line of special value to geographers, namely, that of having the statistics of that Bureau tabulated by physiographic provinces, instead of exclusively by states.

The Council confirmed the action of the late President Heilprin in appointing A. P. Brigham as delegate of the Society to the International Geographical Congress to be held in Geneva, Switzerland, during the coming summer.

A Committee charged with the duty of considering various profitable lines of effort for the Society recommended, among other things, that a sub-committee be appointed to further the knowledge and use of accurate maps in educational work. The original committee,

whose work continues, consists of W. M. Davis and Cyrus C. Adams. On the sub-committee were appointed Cyrus C. Adams, J. Paul Goode and Ellen C. Semple.

Officers elected for the following year are: President, G. K. Gilbert; First Vice-President, R. D. Salisbury; Second Vice-President, Ellen C. Semple; Secretary, A. P. Brigham; Treasurer, N. M. Fenneman; member of Council for three years, R. S. Tarr.

The following new members were elected: Rowland M. Harper, College Point, N. Y.; Philip Sidney Smith, U. S. Geol. Survey; William Lawrence Tower, Chicago; Lawrence Martin, Madison, Wis.; and Eliot Blackwelder, Madison, Wis.

It was all but formally decided that the fifth annual meeting will be held at New Haven under the auspices of Yale University.

THE RAIYAN CANAL.

At the December meeting, 1907, of the Khedivial Geographical Society, Sir William Willcocks, formerly Director-General of Reservoir Studies, urged the Egyptian Government to proceed at once with the execution of the Raiyan Canal, repeating the assurances of its feasibility and value previously made by him. It was described by him in his work "Irrigation in Egypt" (1889); and, in 1904, in his lecture delivered before the same Society, in Cairo, entitled "The Assuan Reservoir and Lake Moeris." On that occasion he said: "There is no more complete and perfect project before the world to-day than this combined reservoir and lake project. To the imagination, it affords one of the most fascinating views which the mind of man can conceive. Viewed from its humanitarian side, it is equally attractive." This subject was first presented to the American Geographical Society at a special meeting in October, 1882. The details of the repeated examination of the Fayoum Basin, and the discovery by Mr. Cope Whitehouse of the Wadi Raiyan, which occupies the place of the Lake Moeris on the Ptolemaic maps, were printed in the BULLETINS of this Society (1882 and 1889). The subsequent efforts of the author of this project to overcome the unexplained opposition of the English officials, in the Ministry of Public Works, to the advice of their own expert are set forth at some length in a Senate document (No. 104, January, 1906). It will be remembered that M. Linant de Bellefonds, the famous chief-engineer of Mehemet Ali and his successors, Abbas, Said and

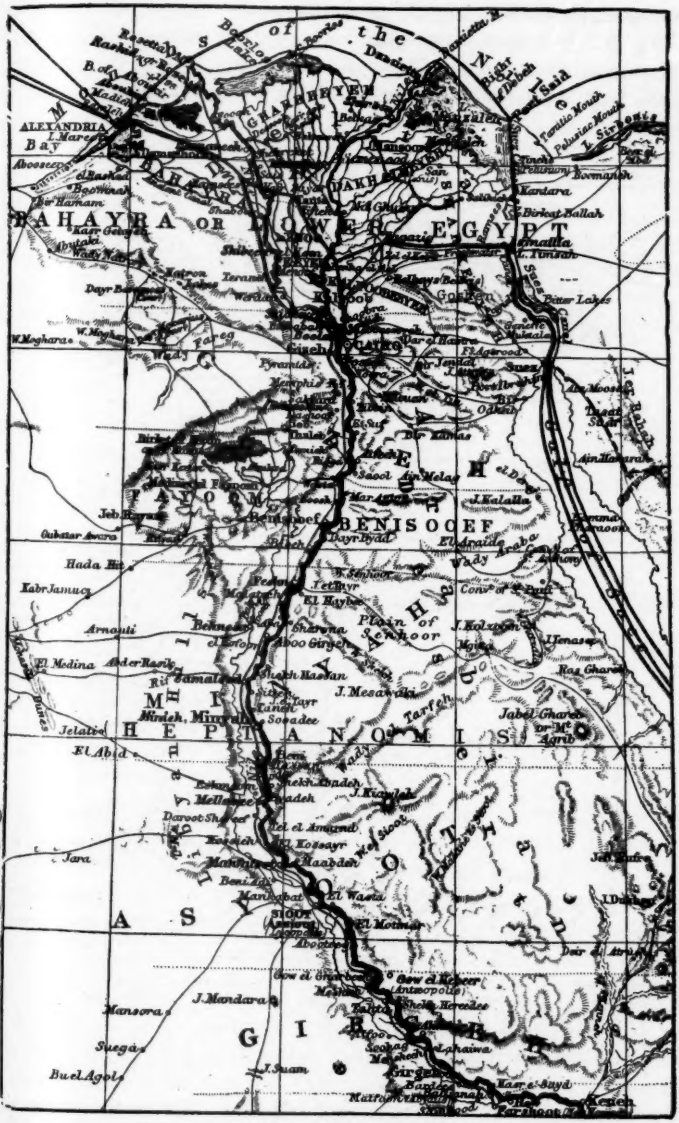


FIG. 1—MAP OF EGYPT. (LENT BY MR. FRANK C. CLARK.)

Ismail, had informed the cartographers that the Desert to the south of the Fayoum was higher than the Nile. Therefore, the map drawn for Dr. Lepsius was followed by all the geographers prior to 1882, when it was asserted by Mr. Cope Whitehouse, on evidence which was presented, in 1883, to the Khedivial Geographical Society, that there was in fact an area of about 250 square miles, not

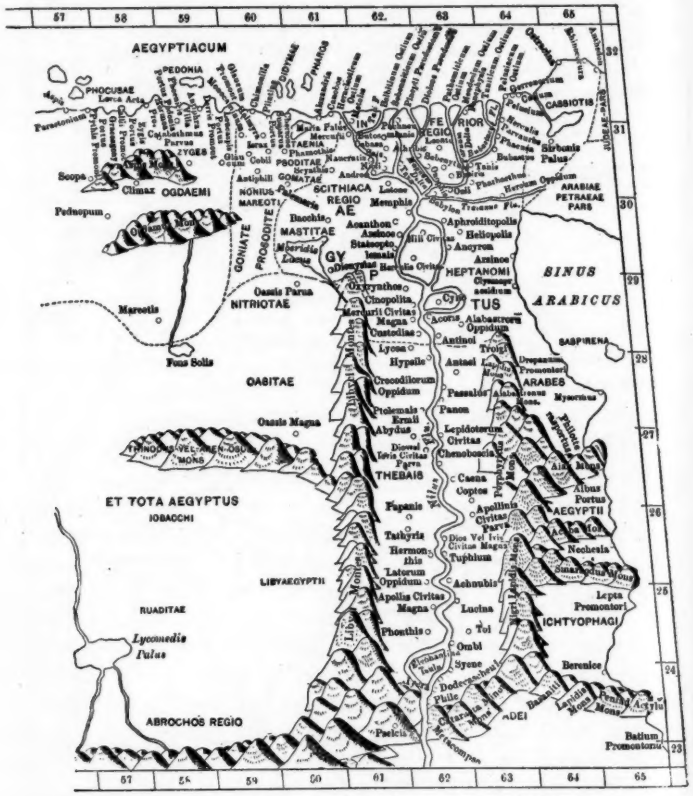


FIG. 2—ANCIENT EGYPT. FROM THE MAP IN THE PTOLEMY OF 1508.

unlike the Salton Sink in its depth, at all events, below the level of the Nile; and that its lowest part was 120 feet below the Mediterranean. It is, therefore, capable of acting as a flood escape; and as a reservoir, without pumping, through the utilization of the difference of about 20 feet between High and Low Nile at the mouth of the Canal, which would serve as intake and outlet. The total con-

tents of the reservoir have been determined to be 22,000 million cubic meters. The available water supply would be well in excess of 3,000 million cubic meters. In other words, three times as much water would pass through the Raiyan Canal, as is claimed to be contained in the Assuan Reservoir, during the three months of short supply. More water would reach the Delta from the Raiyan Canal during the same period than through the Nile itself. The accompanying map shows the general shape and situation of the basin. Col. Western, Director-General of Works, favored a canal as indicated by a heavy black line, but the direct route, as shown in the Section, is only thirteen kilometers. This Section is the result of a special survey, in which pits were dug to ascertain the character of the soil and rock, for the Technical Commission on Reservoirs, of

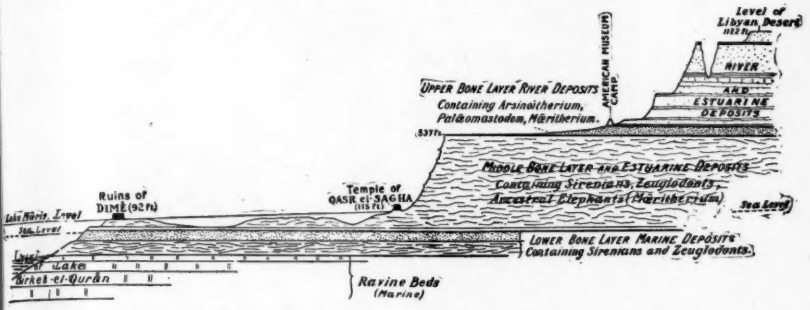


FIG. 3—SECTION FROM THE BIRKET-EL-QURUN TO THE HIGH LEVEL OF THE LIBYAN DESERT.
From the "Century Magazine," October, 1907, by permission of Prof. Henry F. Osborn.

which the late Sir B. Baker and M. Boulé were distinguished members.*

The results predicted from the Assuan Reservoir have not been realized. The pledge, which it was supposed rested upon the honor of the British Government, that Philæ would not be submerged, has been broken. It is now intended to raise the Dam by seven meters. It must be borne in mind that even had the Egyptian cotton crop shown a considerable increase, there has been a large diminution in cereals, and, more especially, in sugar and rice. Even in the Sudan, the water is husbanded, so that the peasants are no longer allowed to take water from the river for their own crop, as they had done from time immemorial.

* See Official Reports of Proceedings, with the minority opinion of M. Boulé and the evidence of Mr. Cope Whitehouse against the Assuan Dam, Cairo, 1894.

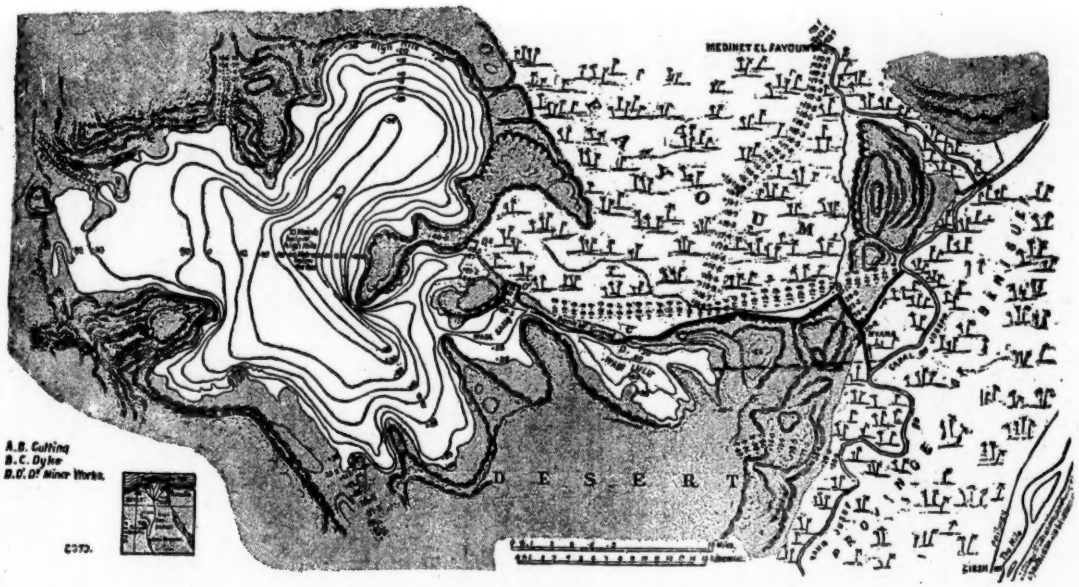


FIG. 4—RAIYĀN BASIN, DRAWN BY COPE WHITEHOUSE, 1888.

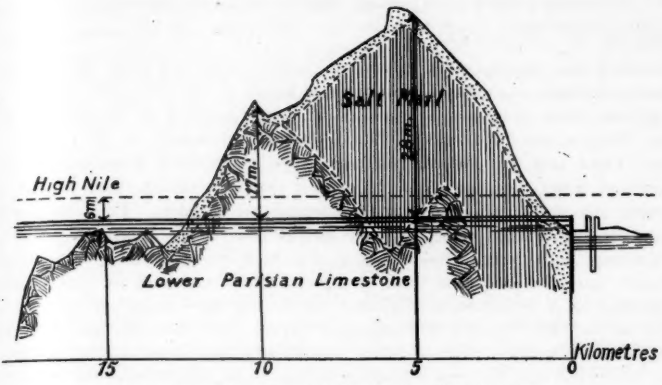


FIG. 5—WADI RAIYAN—THE RAIYAN ISTHMUS, NILE VALLEY.

FIG. 6—SAND DUNE IN WADI RAIYAN, 100 FEET BELOW SEA-LEVEL.
From the "Century Magazine," October, 1907, by permission of Prof. Henry F. Osborn.

"Lecturing in this Hall in January, 1904, on the Assuan Dam and Lake Moeris," said Sir W. Willcocks,

"I stated that Egypt needed reservoirs capable of storing 4,000 million cubic meters of water, to supplement the summer supply of the river, and increase the Egyptian cotton crop from 6½ million of hundredweights to ten millions, and add $300,000,000 (£60,000,000) to the agricultural wealth of the country. I then stated that the Assuan reservoir actually contained 1,000,000,000 cubic meters of water; but that I had designed it capable of being raised another six meters, and storing an additional 1,000,000,000 cubic meters. That would have given us two billions; while the Wadi Raiyan reservoir could have given us the remaining 2,000,000,000, besides being able to bring appreciable relief to the country during a dangerous flood. I urged the construction of the Wadi Raiyan reservoir, as it would eventually have become the flood escape of the Nile, as soon as the river training and storage works on the White Nile had insured a sufficiency of summer water to Egypt. I concluded my lecture by saying, 'When the additional supplies from the upper waters of the White Nile had become so ample that it will be possible to dispense with the Wadi Raiyan as a reservoir, the Wadi with its canal will become the flood escape of Egypt like the ancient Lake Moeris, and Egypt, in the fullest meaning of the terms, will be enjoying perennial irrigation and flood protection.' Sir William Garstin approved of the raising of the Assuan Dam, which he said should not exceed in cost $2,500,000 (£500,000) but he did not recommend the present utilization of the Wadi Raiyan as a storage reservoir. It would have been a fortunate day for Egypt if the work of raising the Assuan Dam and constructing the Wadi Raiyan Canal had been undertaken at the same time with the splendid talus works down stream of the Dam; the Dam to-day would have been raised the full height for which it was designed and be impounding 2,000,000,000 cubic meters of water. The Wadi Raiyan Canal would have been completed; and the Wadi, like a true modern Lake Moeris, would have been ready to receive the surplus waters of the Nile in dangerously high floods. Egypt would have had its summer supply reserves doubled, and be free from the danger of an inundation. The money spent on the works would have been some of the best money Egypt had spent since King Amenemhat, four thousand years ago, made the ancient Lake Moeris and saved the country from the terrible evils of inundation. It was not, however, to be, and where do we stand to-day? The Assuan Dam is holding up its single billion of cubic meters of water; and works, which will take five or six years to complete, are being undertaken to raise the Dam seven meters and widen it five meters, so that it may hold up an additional 1,333 million cubic meters of water, at a cost of $5,500,000 (£1,100,000). The additional width of base of five meters is being built, not on a foundation designed and prepared for supporting a massive wall subjected to an ever-varying pressure, but on the apron, designed and constructed for insuring a safe flow of water along its surface. This patch-work addition of unhomogeneous masonry is to be tied by countless iron bars to the down-stream face of the main Dam. If the new work settles anywhere, as it may do, it is within the range of probability that it will tear off the face-work of the Dam, which face-work, as built, is itself unhomogeneous with the interior masonry of the Dam. I have tried in vain to fathom the reasons which led the late Sir Benjamin Baker, as Consulting Engineer to the Government, to advise the raising of the Dam by seven meters when he had re-

sisted its being raised by six. The late Sir Benjamin Baker was a really big man, accustomed to very big things, and when he made a mistake he made a very big mistake, and Egypt is now paying $3,000,000 (£600,000) to cover that mistake. But the action deceives nobody, and all this foolish punching of holes and colossal waste of public money is a source of ridicule to the independent engineers of the country who know the history of the Dam."

GEOGRAPHICAL RECORD.

AFRICA.

WATER IN THE SAHARA.—While Civil Engineer David Levat was studying the metalliferous beds along the frontier in southeastern Morocco and southwestern Algeria (the region between Aïn Sefra, Shott Tigri and Figuig) he found impermeable rock under permeable strata (cretaceous sandstone). In view of the importance of water in the irrigation of the oases he endeavoured to ascertain the position of this impermeable level beneath the desert surface. The results were reported in the *Annales des Mines* (Jan., 1905) and reprinted (Dunod, Paris, 1905) under the title *Note sur la Reconnaissance d'un Niveau Aquifère dans le Sud-Oranais et dans le Sud-Marocain.* The study is of large practical as well as scientific value. It proves that the cretaceous belt, which extends along the northern edge of the desert and is about 120 miles wide, is underlain by a large supply of good water, which comes to the surface in some places and can everywhere be made available without much difficulty by means of comparatively shallow wells.

THE UPPER CURRENTS IN EGYPT.—The *Survey Notes* of the Egyptian Survey (No. 14, Nov., 1907) appropriately bear the legend, *Ex Africa semper aliquid novi,* for they contain a discussion, by B. F. E. Keeling, of "Upper Air Research at Helwan." Certainly it is something very new to find that a systematic campaign has now been undertaken to investigate the conditions of the free air in Egypt. Only pilot balloons have thus far been employed, Mr. Keeling noting that it is quite impracticable, in Egypt, to send up self-recording instruments, "as the balloons would almost invariably burst on the desert between the Nile and the Red Sea, or even further to the east, and the prospect of ever seeing them again would be extremely remote." The ascents in August and September, 1907, showed the following conditions: The trades were 900-2,000 meters thick. The transition area between trade and anti-trade was some 3,000 meters thick. The direction of the anti-trade was from west to southwest, the average direction being about west-southwest. Deviations from this general arrangement were common.

During September, the trade wind showed signs of becoming thicker, and the transition stage was more drawn out. On September 6 the westerly anti-trade came down to about 700 meters. On the 24th the anti-trade was not reached below 6,000 meters. On the 27th, although the surface wind was almost absent, the lower limit of the anti-trade was 3,000 meters high.

On the four days on which the observations reached 5,000 meters or more, the mean velocities for successive zones of 1,000 meters were 5.0, 7.0, 7.8, 10.2 and 9.0 meters per second, in ascending order. R. DeC. W.

DUST STORMS IN EGYPT.—In the *Survey Notes* for November, 1907, published by the Survey Department of Egypt, reference is made to the circular dust storms (desert whirlwinds) observed on the plateau traversed by the Abyssinian Railway. These storms were seen after the first ascent from the coast, especially in the afternoon. As many as eight or ten could be seen at once. They appeared to be almost stationary, and were of great height. On the road from Diré Dana to Addis Ababa about sixty of these whirls passed close enough to the observer to make the direction of rotation clearly visible. In all but two cases the motion was clockwise. The whirls moved with the prevailing wind, generally from east to west, but the velocity of advance appeared to have no definite relation to the wind velocity. The rotational velocity was enough in one case to lift a closed umbrella, a hat and a walking stick from the ground and to carry them several meters. In another case, some small branches were broken off of a mimosa tree. The top of the whirls generally spread out in a disc-shape, and around the margin a few birds were often seen, apparently looking for insects caught up by the ascending air. The indraught was greatest on the front of the whirl, and near the ground. Here the stream-lines of the air were plainly visible in the dust. The whirls which passed near the observer were accompanied by a roaring sound. R. DeC. W.

THE CLIMATE OF ERITREA.—There are three zones: (1) the coast zone; (2) the zone of valleys and escarpments, and (3) that of the high plateau and alpine summits. In the coast zone the heat and humidity combine to make conditions very trying to Europeans. Rain falls, as a rule, in November to April only. In the second zone, the régime of the summer monsoon rains is found, although portions near the coast have winter rains also. Thus it is well to subdivide into the slopes facing the seaboard and those facing the Sudan. On the seaboard slopes a great diversity of products may be cultivated, according to the altitude, but the climate is trying for Europeans. The continental slopes, *per contra,* forming about three-fifths of the whole area of Eritrea, are drier and cooler at night. The third zone, above 6,000 feet, includes only a small portion of Eritrean territory. Most of the rain falls in summer (monsoon). The maximum temperature comes in the dry season from November to May (*Quart. Journ. Roy. Met. Soc.,* Oct., 1907). R. DEC. W.

RAILROADS IN GERMAN EAST AFRICA.—It is learned from the *Verhandlungen* of the Kolonial-Wirtschaftliches Komitee (Dec. 19, 1907) that the Daressalam railroad has been completed over 100 miles inland to Morogoro and that traffic was opened over the section on Dec. 16. The preliminary studies have been concluded for the extension of the line to Tabora, south of the Victoria Nyanza and an important trade collecting point. Preparations are being made for the extension of the Usambara railroad to the Pare mountains and to Mount Meru. The projected railroad from Kilwa-Kissiwani on the Indian Ocean to Lake Nyasa is now certain to be built.

AFRICAN ETHNOLOGY.—The South African Museum, Cape Town, issues as Part V., Vol. V of its *Annals* a report by Dr. F. C. Shrubsall "Notes on Some Bushman Crania and Bones from the South African Museum." It is an important contribution to the ethnology of that region, though based on the study of only eighteen skulls and bones. Starting with a series of the skulls of Strandloopers the author says they constitute a group purer than that of the Bushmen and apparently quite distinct from the Hottentots. The up-country Bushmen are inter-

mediate between the Strandloopers and the Hottentots, while the latter are between the up-country Bushmen and the Bantu and, in many respects, more nearly approach the Negroes of British Central Africa than the Kafir tribes of the east coast.

The author says the Central African pygmies, by their prognathism, are clearly removed from the Bushmen and the forest pygmies seem to be largely mixed with the Negro strain. Thus the purest dwarf race was recently located at the extreme south of the continent, the farthest point to which they could retreat from the attacks of stronger peoples.

Dr. Shrubsall deduces the conclusion from his studies that the first inhabitants of South Africa were of the Bushman type. Tall Negro tribes of the Great Lakes and the upper Nile Valley were driven southward by pressure from the east and they, in turn, forced the Bushmen, some to the extreme southern coast and some to the forests, where they intermarried with their neighbours. Other Negroes passed north of the forest zone towards the Atlantic and tribes from across the Sahara drove some of them back to the forest and others down to the Atlantic, where they physically deteriorated owing to unsuitable environment. Some of the Negroes forced down the Nile Valley may have taken with them or driven before them survivors of the northern Bush races and, in this way, the dwarfs came into contact with Egypt. It is possible, however, that the range of the dwarfs formerly extended much further north than has been supposed.

These conclusions rest upon the examination of a comparatively small number of skulls and it is to be hoped that Dr. Shrubsall's speculations will be extended and supplemented.

Life Zones of Ruwenzori.—In the paper by R. B. Woosnam of the British Museum Expedition to Mount Ruwenzori, read at the Leicester meeting of the British Association in August last (Geog. Jour., Dec., 1907), he describes the fairly well-marked zones of vegetation extending around the ridge in belts. The boundaries of these zones are not so well defined on the west side and extend lower down than they do on the east, which may probably be accounted for partly by the more humid climate of the west side and of the Congo basin. He enumerates six zones as follows:

Grass Zone.—Extending from the foot of the range to an altitude of 6,500 feet on the east and somewhat lower on the west. It includes most of the flora and fauna of the surrounding districts.

Forest Zone.—From 6,500 to 8,500 feet. The lower margin of the forest zone is almost as tropical in appearance as the forests of Uganda and the Congo; but at 7,000 feet much of the tropical nature of the vegetation disappears and species of birds and mammals, known only from Ruwenzori, begin to appear. Up to this altitude animal life is abundant, there being a large variety of small mammals, and on a bright morning the forest teems with bird life. Above the forest there is a marked contrast and, as the higher regions are reached, signs of life become rarer.

Bamboo Zone.—Extends on the east side from 8,500 to 10,000 feet and on the west from 7,000 to 8,500 feet. Where it is unmixed with forest it is impenetrable without cutting a path. In these bamboo jungles there is little or no life, the mammals, with the exception of monkeys and chimpanzees, finding no food, and birds preferring more open country.

Tree-heath Zone.—From 10,000 to 12,500 feet. The scenery in this zone is

extraordinary. Trunks and branches of trees are wrapped in thick coats of moss and the trees lean at all angles. A layer of soft moss, a foot or more deep, makes walking difficult and dangerous. Very few birds inhabit these wet and gloomy regions.

Lobelia and Groundsel Zone.—From 12,500 to 14,500 feet. Stately lobelias and fantastic senecios are the characteristic vegetation. Everlasting-Flower bushes, which are conspicuous a little above 11,000 feet, grow in profusion. The ground is soft, black mud covered over with deep moss of many shades of green and yellow. The lobelia growing here is a species new to science (*Lobelia Wollastoni*) known only from Ruwenzori but closely allied to an Abyssinian species (*Lobelia rhynchopetalum*).

Snow Zone.—From 14,500 feet to highest summit, 16,815 feet. Permanent snow lies at about 14,500 feet and, as Ruwenzori is practically on the equator, the snow line is constantly at the same altitude. No birds or mammals live above the snow line. Butterflies, moths, and diptera were seen on the snow up to 16,000 feet, but they were accidental stragglers and not residents. A few lichens and mosses were seen on the bare rocks above the snow.

The larger mammals, such as elephants, buffaloes, and waterbuck do not ascend the mountains above 5,500 feet. The bushbuck sometimes goes up to 7,000 feet. Wild pigs and the lions that prey on them are met with in the forest zone. Of the birds the majority are small, and kites, buzzards, and ravens were the largest found. No birds or mammals with special adaptations to the wet and cold of Ruwenzori were noticed; on the contrary, the most numerous species, inhabiting the wettest and coldest zone from 12,500 to 14,000 feet, is a sun-bird of brilliant colour.

AMERICA.

Minerals in Solution in the Lehigh River.—Hydrologists of the U. S. Geological Survey have been making a study of the quality of the water of the Lehigh River. The analyses made by chemists in the Survey's laboratory at Washington show that each year about 270,000 tons of dissolved minerals are carried past South Bethlehem. Of this quantity, 10.2 per cent. is silica, more than 15 per cent. is calcium, washed into the stream as sulphate and carbonate of lime; nearly 6 per cent. magnesium, nearly 8 per cent. sodium and 1 per cent. iron. The sulphate compounds are the chief constituents, amounting to about 116,000 tons a year; the carbonates are next in rank, aggregating about 86,000 tons a year. These quantities seem great, but the materials are washed into the stream from a large area. For each acre of ground that the river drains it bears away only 1¾ pounds of minerals daily.

Geological Survey Work in Alaska.—The work of the Survey in Alaska, during 1907, was confined to a detailed study of the copper deposits on Kasaan Peninsula, Prince of Wales Island. A topographic map of this area was made in May and June by Mr. D. C. Witherspoon and Mr. J. W. Bagley. In July and August Messrs. C. W. Wright and Sidney Paige mapped the geology of the peninsula and in September and October Mr. Wright made a study of the ore deposits. The results of this work and a summary of the mine developments will be printed in the annual report of progress of investigations of Alaska's mineral resources, which will be issued in June.

Bulletin of the Mount Weather Observatory.—The U. S. Weather Bureau

has begun the publication of this quarterly, which will contain accounts of the researches conducted at the Mount Weather Observatory. No. 1 is a handsomely printed large octavo magazine of 63 pp., besides six-page charts of upper air isotherms, nine-page half-tones of the administrative building of Mount Weather, kites, and other appliances for observation and three text figures. The articles in the first number deal with the origin and purposes of the Observatory, the methods and apparatus used, the results of kite flights, and the use of upper air data in weather forecasting, the last article written by Professor A. J. Henry.

CHIEF GEOGRAPHER OF THE U. S. GEOLOGICAL SURVEY.—Mr. Robert B. Marshall of the Survey has been appointed to administrative charge of the Topographic Branch with the above title. He has been connected with the Survey since 1890. In 1903 he took charge of topographic work in California and his district was enlarged two years later to include Oregon. In 1907 he was made geographer in charge of the newly formed Pacific Division which comprises California, Oregon, Idaho, Nevada, Utah, and Arizona. Mr. Thomas G. Gerdine succeeds Mr. Marshall in charge of the Pacific Division.

ASIA.

THE MAP OF INDIA.—The Government of India (*Report* of the Survey of India, 1904-5) appointed a Committee to consider the condition of the maps in each province and the measures required to bring them up to date. The maps of practically the whole of India were therefore examined in Calcutta. It was found that while these maps were undoubtedly good at the time they were made and their accuracy, so far as they went, was unquestionable, they were inconvenient in size, not up to modern standards in reproduction, had not been prepared on a uniform system, were deficient in heights and levels and were out of date for many parts of the country.

The Committee recommended the preparation of a new series of maps of the whole of India to be produced in colours; the surveys in future, as a rule, to be made on a scale of 2 inches=1 mile for reduction and publication on the one-inch scale.

In order to carry out these decisions it will be necessary to revise in the field practically the whole of the existing 1-inch maps of India and to survey on either the 2- or the 1-inch scale the whole of the country, as maps on those scales have never yet been prepared. The total area, excluding Baluchistan and the Northwest Frontier tribal areas, is 1,673,300 square miles. It is proposed that the whole of this work shall be carried out within twenty-five years, while the survey of Baluchistan, the Northwest Frontier Province, and the adjacent country shall be completed within a much shorter time.

EUROPE.

PROTEST AGAINST THE PROPOSED MATTERHORN RAILROAD.—The Alpine Club in London has adopted a protest against the scheme of piercing a shaft in the Matterhorn and converting its summit into a series of grottos with glazed windows and balconies. Sir W. Martin Conway, who occupied the chair at the meeting, said he believed the Club would enter the heartiest possible protest against the proposed tunnelling of the Matterhorn and the still more atrocious proposition to lay down on the virgin snow of the Aletsch Glacier a sledge railroad which

should traverse the whole length of that marvellous solitude. The Bishop of Bristol urged the desirability of a *freiheit* from invasion by railroads for all Swiss mountains above the limit of perpetual snow or, if this could not be conceded, that there should be immunity for the greatest of the Swiss mountains, which would, of course, include the Matterhorn. Sir F. Pollock said the suggestion of "no railroads above snow line" appeared to be most sound and practical. A letter was read from Mr. J. Bryce expressing his cordial sympathy with the efforts of the English branch of the Swiss Ligue pour la Conservation de la Suisse Pittoresque to elicit a declaration of opinion from lovers of the Alps against the scheme to construct a railroad up the Matterhorn. A letter from Mr. Whymper concluded as follows:

> The project of a railway up the Matterhorn is not a new one. It was formulated more than a dozen years ago and has been held back until what is deemed a favourable moment. It is the scheme of a small group of company promoters. My opinion is that the project of a railway up the Matterhorn is injudicious and undesirable. I think that it will not benefit Switzerland and will be injurious to the guides of the Zermatt valley and to those of the Val Tournanche.

The resolution adopted emphatically approved the protest of the Swiss people against the construction of a railroad up the Matterhorn. On August 31 more than 40,000 signatures had been received in Switzerland to the protest which was to be presented to the Federal Council.

THE OCEANOGRAPHICAL MUSEUM IN BERLIN.—The guide book of the Museum für Meereskunde in Berlin explains the numerous exhibits and contains photographs of many of them. The museum was founded in 1900 by Baron von Richthofen. It fills sixteen rooms, an entire building being devoted to it. Its Director is Prof. Dr. Albrecht Penck, and the collections have been open to the public since 1906 and are also used in some of the courses of the University of Berlin. The large number of models and other exhibits illustrate the phenomena of the sea, its physical conditions, the appliances used in its exploration, the great variety of life it contains, its economic importance, and its history in relation to man. All geographical visitors to Berlin should see these superb and instructive collections.

OCEANOGRAPHY.

THE WORK IN 1907 OF THE MAGNETIC SURVEY YACHT "GALILEE" IN THE PACIFIC.—The *Year Book* of the Carnegie Institution for 1907 contains a report by Dr. L. A. Bauer on the work of the *Galilee* in that year. Dr. Bauer has added information of the movements of the *Galilee* early in 1908.

She left San Diego, Cal., on Dec. 22, 1906, with W. J. Peters as Commander, Messrs. J. C. Pearson and D. C. Sowers, magnetic observers, and Dr. G. Peterson, surgeon and recorder. Captain J. P. Hayes continued as sailing master. The route was to the Marquesas Islands, Tahiti, Apia (Samoan Islands) and Yap (Caroline Islands) to Shanghai, which was reached on May 8. At all ports visited examinations were made with regard to the distribution of the magnetic elements and the *Galilee* instruments were compared whenever possible with magnetic observatory standards. Magnetic observations were made at sea whenever conditions permitted.

Leaving Shanghai on May 31, the vessel arrived on July 15 at Sitka, Alaska, where she was inspected by Dr. Bauer. Mr. P. Dike succeeded Mr. J. C. Pearson, who had been continuously on sea duty for a year and a half and was now assigned to magnetic work in the Yukon territory. Mr. Dike was to take part

in the regular magnetic observations and attempt experimental work in atmospheric electricity.

From Sitka the *Galilee* started on Aug. 10 for a cruise extending over both the north and south Pacific. She reached Honolulu on Sept. 26, and here, as at Sitka, shore magnetic observations were made. Leaving Honolulu on Sept. 26 the *Galilee* reached Lyttelton, New Zealand, *via* Midway Island and Jaluit of the Marshall Islands on Dec. 24. It was expected that she would leave Lyttelton about Jan. 15 for Callao, Peru, where she is due to arrive early in March. Thence she will return to San Francisco about May 1.

The *Galilee* will then have travelled since Aug. 1, 1905, about 65,000 miles, embracing the Pacific Ocean from America to Asia and from the Aleutian Islands to New Zealand. A complete determination of magnetic declination, magnetic inclination, and intensity of magnetic force has been secured at sea about every 200 or 250 miles along the entire route, and numerous magnetic results have also been secured at ports and islands. It is believed that all the results obtained will be reduced and published soon after the vessel's arrival in San Francisco next May. The work has already provided one result of great practical importance to navigation. The Carnegie Institution supplied data to the U. S. Hydrographic Office that enabled it to issue last spring a new chart of the "Lines of Equal Magnetic Variation" (Magnetic Declination). It was found that in the Pacific Ocean the charts were erroneous along some routes by as much as three or five degrees, the errors being of sufficient magnitude to be taken into account in practical navigation.

POLAR.

THE BRITISH ANTARCTIC EXPEDITION OFF FOR VICTORIA LAND.—Reuter reports the return of the steamer *Koonya* to Wellington, New Zealand, after towing the *Nimrod,* Lieut. Shackleton's ship with the British Antarctic expedition on board, to within a mile of the ice. Heavy gales prevailed from Jan. 1 to Jan. 15, when the two vessels parted company. The disconnection of the tow lines was extremely difficult owing to the icebergs. Lieut. Shackleton reports that the *Nimrod* is a wonderful seaboat. His farewell signal was "Crew all well. Confident of success."

DR. CHARCOT'S ANTARCTIC PLANS.—*Reuter* has published further details regarding the expedition which Dr. Jean Charcot will lead to the Antarctic regions next summer. He hopes to start in July and expects to be absent two years, though supplies for three years will be taken. He thinks that the best route southward is by way of the Ross barrier, but he regards this as belonging to English explorers and will not travel that way. He will return to Graham Land, south of South America, and endeavor to reach Alexander Land, a little further south, where it is thought a barrier similar to that of Ross's may be found. The expedition will then try to go as far south as possible, though its main purpose is scientific work.

The Marquis de Dion is building motor sledges for the equipment and the sledges will be tested this winter in the Alps. The ship will be especially strong to resist ice pressure. She will be of barquentine rig, 135 feet long and 30 feet beam, with compound engines of 550 horse power, and will carry 230 tons of coal and 10 tons of provisions. The crew will consist of twenty-two men, ten of whom are members of Dr. Charcot's last expedition. The scientific staff will

consist of the leader, three naval officers, two zoölogists, one geologist, and one physicist for magnetic and photographic work. The French Parliament has already supplied $60,000 and expects to vote another sum of equal amount, private subscriptions have yielded $13,000, and Dr. Charcot is now trying to raise $22,000 more. The Academy of Sciences has prepared the scientific programme, and the Committee of Missions of the Ministry of Public Instruction has drawn up a favourable report on the plans. The Marine Department is contributing the necessary coal and an excellent collection of scientific instruments, and the Oceanographical Institute of Paris is also helping.

ARCTIC METEOROLOGICAL EXPEDITION.—The *Revue Scientifique* says that the Belgian Government is organising an Arctic meteorological expedition, which will start next summer under the command of Mr. Georges Lecointe, director of the Royal Observatory at Uccle.

SCIENTIFIC RESULTS OF THE ZIEGLER POLAR EXPEDITION, 1903-1905.—This handsome volume, illustrated by fine views and maps, treats the scientific work of the Ziegler Expedition, commanded by Mr. Fiala, in 1,630 folio pages. The expedition was deficient in experienced observers and instrumental outfit so that the scientific work was necessarily confined to magnetic, meteorological, tidal, and astronomical observations and deductions, notes and sketches of the Aurora Borealis and map construction and survey work. Astronomical observations for precise geographical positions received considerable attention. The party was unable to give much study to the geology and biology of the region or to make collections in natural history, but it is to be noted that some coal was discovered on Coalmine Island at a high elevation and traces of coal were also found at Cape Richthofen.

More than half of the book is devoted to the results of observations on terrestrial magnetism. A series of graphs has been constructed showing the change of the amplitude of diurnal variation with the time of the year, the times of principal maximum and minimum positions, the epochs of mean declination and the existence and form of the secondary maximum and minimum. A large amount of meteorological information was collected and two satisfactory series of tidal observations were made at points about 150 miles apart. Mr. L. P. Shidy, Chief of the Tidal Division of the U. S. Coast and Geodetic Survey, concludes that the tide wave reaches the Spitzbergen archipelago "by the two channels on either side of Spitzbergen, the one flowing west of that island arriving about four hours earlier." Mr. Fiala's sketches showing the successive appearances of the Aurora on three occasions, reproduced by lithography, are very attractive. The BULLETIN has already referred to the map of the polar regions compiled by Mr. Gilbert H. Grosvenor for this volume, and the map survey work is produced in an excellent set of maps by Mr. Russell W. Porter. Mr. W. J. Peters, who was in charge of the scientific work, was unable, on account of his new duties in the Carnegie Institution, to attend personally to the reduction and publication of the results, and Mr. John A. Fleming edited the volume.

VARIOUS.

GEOLOGICAL NOMENCLATURE.—*The Journal of Geology* (No. 8, 1907) reports that the Mississippi Valley Association of State Geologists has adopted a resolution expressing its belief "in the desirability of a thorough reconsideration of

the principles which should govern the nomenclature of geology and its willingness to co-operate in any movement for the the bettering of present conditions." The Association ordered that copies of the resolution be sent to the secretary of the Geological Society of America, to Director Smith of the U. S. Geological Survey, and to the Conference of Geologists then in session in Washington.

In commenting upon the resolution, Professor Chamberlin, of the editorial staff of the *Journal of Geology,* commended the wisdom of the Association in the adoption of the resolution and expressed the hope that the organizations to which it was sent would respond with hearty co-operation and that the end would be "such wise control of the growth of our nomenclature as shall give it at length the highest practicable serviceability." Professor Chamberlin's remarks include the following:

> It is probably safe to say that several times as many people as are now interested in our science would be among its enthusiastic promoters, if its great truths had been habitually clothed in the plainest available terms in the literature of the past century. The history of the earth and of its inhabitants, the processes of its evolution and the facts of its structure are inherently interesting and, if the story were so told that it could be read easily and intelligibly, it would give both pleasure and profit; but the current of the reader's enjoyment is so often needlessly checked by unintelligible terms, that he soon becomes weary and lays the annoying text aside for something less trammeled by pedantic toggery. This is not solely a layman's affliction. Geological readers of no mean literary and scientific attainments are all too frequently caught and held by the briars and brambles of our crudely technicalized literature.

Revue de Géographie.—This well known periodical, founded by L. Drapeyron in 1877, has become an annual which will be published under the direction of Ch. Vélain, Professor of Physical Geography in La Faculté des Sciences de Paris. Vol. I, embracing the years 1906-7, is a handsome quarto of xxi and 597 pp. The articles are of the best geographical quality and filled with the spirit and results of recent geographic research.

The book is in two parts, the first devoted to original memoirs. Two of the three papers in this section come under the head of physical geography, one of them being "Recherches sur l'évolution morphologique des Alpes de Transylvanie (Karpates méridionales)," by Prof. Emm. de Martonne (279 pp.). The memoir is prefaced by a bibliography of 176 titles of maps, books, and articles relating to the Carpathians. The other paper is "Érosion fluviale, Érosion glaciaire (Observations de Morphologie comparée)" (28 pp.), by Prof. J. Brunhes. Part I. concludes with a study in economic geography "Le Régime douanier des colonies françaises et des pays de protectorat," by Prof. E. Fallot (20 pp.).

Part II. is a critical review of recent geographical research, literature, cartography, and educational methods under 11 titles. Among the best examples of the plan and treatment of topics in this part of the book are Prof. Vélain's "État Actuel de nos Connaissances sur la Géographie et la Géologie du Sahara d'après les Explorations les plus récentes," "Nos Idées Nouvelles sur le Bassin Polaire d'après les Résultats scientifiques de l'expédition Nansen (1893-1896)," by Prof. M. Zimmermann and "Cartographie" by Mr. A. Berget.

Books for Self-Instruction in Eastern Languages.—The Society has received from E. Marlborough & Co., publishers of London, three of the volumes in their self-taught series of languages. The books in this series are compact and intended to meet various needs. Number 17, for example, "Japanese Self-Taught" (108 pp., price, 2s. 6d.), is for those who wish to use the spoken language without the usual expenditure of time to acquire the grammar to which

number 18, "Japanese Grammar Self-Taught," is devoted. "Tamil Self-Taught and Grammar" (216 pp., price, 7s. 6d.), aims to help the student to acquire a knowledge of the grammar of colloquial Tamil in a short time. "Hindustani Grammar Self-Taught" (pp. 120, price, 2s. 6d.), gives the essential points and rules of the grammar in a simplified form. The books are luminous without being elaborate, are excellent bits of text book preparation, and qualified to be of practical usefulness to persons who go to regions where the languages are spoken. All the books in this series relate to the European and Oriental languages.

MONTHLY RECORD OF CARTOGRAPHY.—Geographers will welcome the announcement that the firm of Justus Perthes, Gotha, intends to issue a monthly publication in the form of a supplement to *Petermanns Mitteilungen* to supply information on new publications in the field of cartography. Its name will be the *Kartographischer Monatsbericht.* The editor will be Dr. H. Haack, who in the *Geographen Kalender* has published an annual list of the most conspicuous maps. The purpose of the publication is to print exhaustive reports on new maps issued either by governments or private firms, and also on all publications dealing with cartography in a large sense. The publication should be of special value to American geographers who hope that in the near future cartography and map reading may be more adequately represented in our school courses.

USING THE TIDE TO GENERATE ELECTRICITY.—*Science* says it is reported that a joint stock company has purchased a large tract of land at the mouth of the Elbe, where power works are to be erected and the ebb and flow of the tide will be utilized in generating electric energy for factories soon to be established.

CONVERSION OF CENTIGRADE INTO FAHRENHEIT READINGS.—Dr. G. Hellmann, of Berlin, has recently suggested a simple method of converting Centigrade into Fahrenheit thermometer readings. The usual way of obtaining 9/5 of the Centigrade readings is awkward, and not readily carried out in the head. Hellmann uses 18/10, and this gives the multiplier of 2-2/10. Thus 15°C. becomes 30°—3°=27°Fahr. And 27° added to 32° gives 59°Fahr. Or, if preferred, 1/10 of the original Centigrade reading may first be subtracted, and then the resulting number multiplied by 2. Thus, 15°C.—1.5°=13.5°; and 13.5°×2=27°+32° =59°Fahr. R. DeC. W.

A COURSE OF SIX LECTURES on the geographical distribution of rainfall in the British Isles was given by Dr. H. R. Mill in the map room of the Royal Geographical Society on Thursday evenings in January and February, 1908.

"THE RED BOOK OF NIAGARA" has been enlarged. Many of the new photographs were taken by Mr. Irving P. Bishop, the author. The scientific sections give information about the geology and botany of the region that will interest every intelligent traveller. This guide is published by Charles A. Wenborne, Buffalo, at 25 cents.

THE JANUARY NUMBER of the *Bulletin* of the Geographical Society of Philadelphia contained the addresses at the meeting of the Society in memory of Prof. Angelo Heilprin. The speakers were Mr. Alba B. Johnson, President of the Society; Mr. Henry G. Bryant, Dr. E. J. Nolan, Prof. R. H. Chittenden, Mr. Herbert L. Bridgman, Prof. William Libbey, Mr. Frank B. Greene, and Dr. Theodore Le Boutillier.

"LE CALENDRIER-ANNUAIRE POUR 1908" (sixth year), published by the Catholic Mission of Shanghai, is a well-printed almanac and record of events. It includes astronomical tables for the year, a list of elevations above sea-level of many important towns on the Chinese railroads, open ports and markets with amount of commerce in 1906, principal events in China for the year July, 1906-June, 1907, meteorological data, statistics of Chinese railroads, names of postal and telegraph stations, conversion tables for Chinese and foreign money and much other information.

PROF. J. PAUL GOODE, of the University of Chicago, is spending six months at Washington ,to consult the geographical works in the Congressional Library.

MR. BAILEY WILLIS, of the U. S. Geological Survey, gave six lectures at the University of Illinois in February, most of them dealing with the past and present geography of North America. He also gave an account of his recent geological experiences in China.

The Imperial Russian Geographical Society celebrated on the 17th of February the Twenty-fifth Anniversary of Prof. Dr. A. de Voeikoff's presidency of the Meteorological Commission.

PROF. ROLLIN D. SALISBURY, University of Chicago, and Dr. H. Foster Bain, State Geologist of Illinois, are giving special lectures in geology at the University of Wisconsin this year.

MR. HENRY G. BRYANT has presented the anthropological collections he made among the Eskimos to the University of Pennsylvania.

THE WYOMING HISTORICAL AND GEOLOGICAL SOCIETY, of Wilkes-Barré, celebrated on the 11th of February the 50th Anniversary of the Society and the 100th Anniversary of the Burning of Wyoming Coal for Domestic Use.

SAILING VESSELS are still active in spite of the extensive traffic of steamships. Even now the carrying of grain from the Pacific Coast to Europe is done almost wholly by sailing vessels, which also carry a large percentage of the lumber exported from the southern ports of the United States. The full-rigged ship is being replaced by barks, barkentines, and other vessels having fewer sails and less rigging than ships, and therefore requiring fewer sailors. At the same time there is an increase in the size of the hulls and thus the decrease in the number of the crew is accompanied by an increase in the carrying capacity of the vessels. Labour is saved in the operation of sailing vessels by economizing in the construction of the hull and in the character of the rigging, and sometimes by the use of steam winches for hoisting and lowering sails and other mechanical devices for saving hand labour. From "Ocean Freight Rates," by Frank Andrews (U. S. Dept. of Agric., Bureau of Statistics, *Bull.* 67).

AMERICAN GEOGRAPHICAL SOCIETY.—The Annual Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, January 21, 1908, at 8.30 o'clock, P. M.

Mr. Anton A. Raven in the chair.

The following persons, recommended by the Council, were elected Fellows:

Adolph L. Bernheimer,	Henry Phipps,
Bayard Tuckerman,	Charles G. Rockwood.

The Report of the Council for the year 1907 was presented and read by the Secretary, Mr. Levi Holbrook:

The number of Fellows on the 1st of January was 1,403, and on the 31st of December 1,319, of whom 363 were Life Fellows.

The additions to the Library during the year were 4,569: Periodicals and pamphlets 3,334, Books 625, Maps and charts 590, Atlases 20.

Rooms in the Society's house have been placed at the disposal of the Geography Teachers' Association for its occasional meetings.

For the condition of the finances reference is respectfully made to the Treasurer's report, herewith presented.

All of which is respectfully submitted.

CHANDLER ROBBINS,
Chairman.

LEVI HOLBROOK,
Secretary.

The Report of the Treasurer, Mr. Henry Parish, Jr., for the year 1907 was read:

The amount on hand January 1 was	$2,321.70
During the year there were received for Fellowship Dues, Sales of Publications, Interest on Investments and Donations	22,498.32
	$24,820.02
There were expended for Exploration, Salaries, Meetings, Library, Publications, House expenses, Insurance and Postage	20,851.17
The amount on hand December 31 was	$3,968.85

The reports were approved and ordered on file.

The Report of the Committee charged with the duty of selecting candidates for the offices to be filled was presented and read:

January 11, 1908.

The Committee appointed November 21, 1907, to nominate and recommend to the Society suitable persons to be elected in January, 1908, to fill vacancies then existing in its offices, respectfully report that they recommend the election of the following named persons to the offices below designated:

	TERM TO EXPIRE IN
President—ARCHER M. HUNTINGTON	1909
Vice-President—JAMES D. HAGUE	1909
Vice-President—JOHN GREENOUGH	1911
Treasurer—HENRY PARISH, JR.	1909
Domestic Corresponding Secretary—ARCHIBALD D. RUSSELL	1911
Councillors—HENRY HOLT, FORDHAM MORRIS, HERMAN C. VON POST, JOHN S. BARNES,	1911

CHANDLER ROBBINS,
WM. WATTS SHERMAN,
HAMILTON F. KEAN,
Committee.

The Chairman asked the pleasure of the Society with regard to the report. It was moved and seconded that Mr. Cyrus C. Adams be authorized to cast the vote of the Society for the persons named. It was so done, and they were declared duly elected.

The Chairman then introduced Mr. Frederick Monsen, who addressed the Society on The Land of the Navajo. Stereopticon views were shown.

On motion, the Society adjourned.

NEW MAPS.

AFRICA.

ABYSSINIA.—Itinerario al Lago Zuai del Dottor Lincoln de Castro (Feb., 1907). Scale, 1:580,000, or 9.1 statute miles to an inch. *Bollettino* of the Italian Geographical Society, Rome, January, 1908.

A black and white sketch map showing Dr. de Castro's itinerary from Addis Ababa to Lake Zuai, one of the series of lakes occupying depressions between Addis Ababa and Lake Rudolf. The topography and distribution of cultivated lands are shown, also a considerable number of small lakes not indicated as yet on atlas sheets.

CONGO FREE STATE.—Carte Politique de l'État Indépendant du Congo. Scale, 1:4,000,000, or 63.1 statute miles to an inch. Département de l'Intérieur, État Indépendant du Congo, Brussels, 1907.

This new edition of the map gives the latest cartographic information relating to the Congo Free State. The nomenclature is very large and every name may easily be found by referring to the index letters on the margins. Symbols differentiate the administrative town of each district and zone, the state stations, European settlements, Catholic and Protestant missions and villages. Telegraph lines and railroads in operation or building are indicated, rivers navigable for steamers are in blue, and other rivers in black. The boundaries of the districts and zones are in colours. It would have added to the value of the map if the concessions of territory to trading companies had been outlined.

GOLD COAST.—Gold Coast. Scale, 1:125,000, or 1.9 statute mile to an inch. Sheets, 72- K- IV (Fumso), 72- Q- II (Prashu). Published under the direction of Major F. G. Guggisberg, Director of Surveys, Gold Coast. London, 1907. (Price, 2s. a sheet.)

The earlier sheets of this important survey have been noticed in the BULLETIN. The width of many of the rivers at various points is given in feet. Roads that have been carefully surveyed are printed in red. The character of the roads, whether wagon road, bush track, hammock road, or hunters' trail, is indicated. Heights above sea level are in feet. Six symbols for towns show different degrees of importance.

AMERICA.

U. S. GEOLOGICAL SURVEY MAPS.

UNITED STATES.—Preliminary Geologic and Structural Map of the Lompoc and Guadalupe Quadrangles, California, including a large part of the Santa

Maria Oil District. Scale, 1:125,000, or 1.9 statute miles to an inch. Washington, D. C., 1907.

Illustrates Bulletin 322, by Ralph Arnold and Robert Anderson, on the geology and oil resources of the Santa Maria oil district. Contour interval 100 feet. Fourteen tints and fifteen symbols are used for geological data. The geology is not entirely shown, as it has not been completely studied. This region in the northern part of Santa Barbara County has given promise for three years of becoming one of the most productive oil fields of the West.

U. S. HYDROGRAPHIC OFFICE CHARTS.

Pilot Charts of the North Atlantic Ocean, December, 1907, and January, 1908.
Pilot Chart of the North Pacific Ocean, February, 1908.

CANADA.—Geological Map of the Cascade Coal Basin, Alberta. Sheet 1, Panther River; Sheet 2, Cascade River; Sheet 3, Canmore; Sheet 4, Wind Mountain. Scale, 1:63,360, or 1 statute mile to an inch. Geological Survey of Canada, Ottawa, 1907.

The map illustrates a report, by D. B. Dowling, on the Cascade Coal Basin in Alberta, within and to the east of the summit of the Rocky Mountains. Each sheet is divided into two sections, on which are shown the geological and the topographical data respectively. The productive coal areas are in green, coal seams are indicated, and the contour interval is 200 feet. Each sheet is accompanied by a section to aid the understanding of the general structure, which consists mainly of simple types of long, narrow, fracture blocks tilted up sideways and resting against one another.

CANADA.—Geology and Natural Resources of Parts of Counties Ottawa and Pontiac, Quebec, and Carleton and Renfrew, Ontario. (Pembroke Sheet, No. 122.) Scale, 1:253,440, or 4 statute miles to an inch. Geological Survey of Canada, Ottawa, 1907.

Accompanies report on the geology and natural resources of this region by Dr. R. W. Ells. Ten tints show the distribution of the rock formations and symbols indicate the position of mineral resources, quarries, strike and dip.

BRAZIL.—Map of the Madeira and Mamoré Rivers between San Antonio and Guajará-Merim. Reduced from the survey of Franz Keller. Scale, 1:506,488, or 8 statute miles to an inch. J. B. Lippincott Company, Philadelphia, 1907.

Illustrates the book "Recollections of an ill-fated Expedition," by Neville B. Craig. A good map on a comparatively large scale of the entire region of the falls in these rivers.

BRAZIL.—Rio Grande do Sul. Scale, 1:500,000, or 7.8 statute miles. *Deutsche Erde*, No. 6, Vol. 6, Justus Perthes, Gotha, 1907.

Illustrates the first part of Gustav von Barsewisch's paper on the names of the German settlements in Rio Grande do Sul. The map shows the distribution of the regions occupied respectively by German and Italian colonists, woodlands, plains, private colonies, etc.

CHILE.—Comisión Chilena de Límites. Sheets: Atacama (3 sheets), and Antofagasta. Scale, 1:250,000, or 3.95 statute miles to an inch. Oficina de Límites, Santiago, 1907.

Each topographical sheet is accompanied by another showing the traverse and triangulation lines upon which the former is based.

PARAGUAY.—Mapa de la República del Paraguay. Scale, 1:2,500,000, or 39.4 statute miles to an inch. In "Geografía de la República del Paraguay," by Hector F. Decoud. F. A. Brockhaus, Leipzig, 1906.

A very good map illustrating a school geography, officially adopted for use in the schools of the republic. It is a good specimen of the style of maps made in Germany for the home schools. So excellent and clear a map stimulates interest in the geographical lesson.

PERU.—Mapa de las Vias Nacionales entre el Pacífico y el Rio Madre de Dios. Scale, 1:500,000, or 7.8 statute miles to an inch. *Boletín* of the Lima Geographical Society, Vol. 16, No. 3, Lima, 1906.

One of the most interesting questions of western South America at present is the extent to which the great Madre de Dios River of the Madeira system can be utilized to carry products of southern Peru eastward, so that, when the railroad about to be built by Brazil around the falls of the Madeira is completed, Peru will have steam connections across the continent with the Atlantic Ocean. The present map is a contribution to this question and is largely based upon the field studies of Señor Enrique S. Llosa and civil engineer Zegarra. The map accompanies a paper by Señor Llosa on the three routes suggested between Mollendo, the large southern port of Peru, and the Madre de Dios. The railroad from Mollendo to Titicaca and Cuzco is utilized as the western part of the route from the Pacific. From this rail route it is proposed that other railroads shall strike eastward to navigable tributaries of the Madre de Dios system. The projected route *via* Urcos would give a steam route between Mollendo and the Madre de Dios about 1,000 kilometers in length; *via* Tirapata the route would be 1,169 kilometers long; and *via* Cuzco 1,076 kilometers.

SOUTH AMERICA.—Niederschlagskarte von Süd-Amerika. Plates 1 and 2. *Ergänzungsheft* No. 157, Justus Perthes, Gotha, 1907.

The 19 maps in these two sheets illustrate a monograph by Ernst Ludwig Voss of Rio de Janeiro in which he summarizes our present knowledge of "Die Niederschlagsverhältnisse von Südamerika." Six tints are used to show the distribution of annual rainfall; seven to show characteristics of the various precipitation areas, one being marked by two rain periods in the year, another by excessive winter rains, etc.; three tints to show average annual rain probabilities. Four maps show the distribution of rain in the southern summer, autumn, winter, and spring; and twelve maps show the distribution of rain for each month in the year. Observations made at 378 stations were used in compiling these maps.

VENEZUELA.—Das Chama-Tal und Die Sierra Nevada von Mérida. Scale, 1:4,000,000, or 63.1 statute miles to an inch. By A. Jahn, Jr. *Zeitschrift* of the Berlin Geographical Society, No. 10, 1907.

The map illustrates an article on the determination of heights in the Sierra Nevada Mountains, in western Venezuela. It is one of the first reductions for atlas purposes from the detailed Topographic Survey sheets which the Central Commission of that country is now producing. The new figures for heights naturally differ from many of the earlier figures.

ASIA.

ASIA MINOR.—Karte von Kleinasien. Scale, 1:400,000, or 6.3 statute miles

to an inch. In 24 sheets. By Dr. Richard Kiepert. Sheets, B III Angora and A III Zafaranboli. Dietrich Reimer (Ernst Vohsen), Berlin, 1907.

These sheets complete this notable map which has been in course of publication since 1902. Although the quality of the surveys of this part of the Turkish Empire is too imperfect to make a fully satisfactory map possible, Dr. Kiepert has critically used all accessible material and the large scale has enabled him to present the topography with all the detail that our present knowledge justifies. Until supplanted by a map based upon fuller surveys this product will remain the most authoritative map of Asia Minor.

KASHMIR.—Map of the Nun-Kun Massif and Surrounding Region in Suru Kashmir. Explored by the Bullock Workman Expedition, 1906. Scale, 1:175,000, or 2.76 statute miles to an inch. *Geog. Journal,* January, 1908, London.

Illustrates Dr. William Hunter Workman's paper before the Royal Geographical Society on the exploration of the above mountain group, where the top of Pinnacle Peak was reached, 23,300 feet above the sea. The map was made from prismatic compass survey and photographs, and adapted to the Indian Survey sheet. Heights are from boiling-point observations. An inset gives a fac-simile of the central part of this district enlarged to the scale of 1:175,000 from sheet No. 45 (SW.) of the Indian Atlas.

TONKIN.—Esquisse Géologique du Haut-Tonkin. Scale, 1:500,000, or 7.8 statute miles to an inch. *Annales de Géog.,* No. 90, Paris, 1907.

Illustrates an article "Contribution à la Géographie Tectonique du Haut-Tonkin," by Mr. G. Zeil. Ten symbols are used to show the distribution of the rock formations and geological faults.

AUSTRALIA.

AUSTRALIA.—Map of Western Australia. Scale, 1:6,336,000, or 100 statute miles to an inch. Geological Survey of Western Australia, Perth, 1907.

Illustrates *Bulletin* No. 30 on the distribution and occurrence of the baser metals in Western Australia. The localities in which eleven metals are found are indicated.

EUROPE.

NORWAY.—Kart over Finmarkens Amt. Scale, 1:500,000, or 7.8 statute miles to an inch. Norwegian Geographical Survey, Christiania, 1907.

Embraces the county of Finmark, which includes the extreme northwestern and northern part of the kingdom. Relief features are not indicated. The nomenclature is large, the hydrography is shown in much detail, and roads, telegraph lines, elevations in meters at trigonometrical stations and much other detail are given.

NORWAY.—Topografisk Kart over kongeriget Norge. Scale, 1:100,000, or 1.5 statute miles to an inch. Sheets, Flekkefjord 4 A, Larvik 9 B, Beierdalen K 14, Iskuras W 7, Nordkap W 1, Bergsfjorden S 4. Norwegian Geographical Institute, Christiania, 1907. (Price, kr. 0.60 a sheet.)

The sheets of this superior topographic map of Norway are produced by lithography and photo-engraving. Hill features are shown by contours with 100 feet interval, standing waters are in blue, rivers in black, glaciers in green,

and forests and important tilled areas are indicated. The location of many small towns is shown without names. Norway's topographic survey is now far advanced and the Geographical Institute is to be congratulated upon the high quality of the maps.

ROUMANIA.—Carte Géologique des Karpates Méridionales. Scale, 1:1,000,000, or 15.8 statute miles to an inch. By Prof. E. de Martonne. *Revue de Géographie* (Annuelle) Tome premier, Année 1906-1907, Paris.

Illustrates Professor de Martonne's memoir on the southern Carpathians; 23 tints and symbols are used to show the distribution of the rock formations. The map is compiled from the works of the geologists who have studied this field.

OCEANS.

SOUTH ATLANTIC.—Karte der Cumberland Bai (Süd-Georgien). Scale, 1:125,000, or 1.9 statute miles to an inch. By A. Szielasko. *Petermanns Mitteilungen*, Vol. 53, No. 12, Gotha, 1907.

Illustrates Dr. Szielasko's article on his investigations in Cumberland Bay. Dr. Szielasko started for the Antarctic in 1906 as physician of the Norwegian whaling steamer *Fridtjof Nansen*, and for the study of Antarctic birds. The vessel was putting into Cumberland Bay, South Georgia, when she struck a hidden rock and sank in six minutes, the crew barely escaping in two small boats with their lives. Fortunately an Argentine whaling station in the bay was able to supply food to the castaways until a ship took them off thirty days later. Dr. Szielasko employed the time in making a geographical study of the bay and its coasts, combining with the most accurate data he could obtain for a map some information from other sources. His map is a good one and illustrates an excellent article. Five tints are used to show contours of elevation, a number of the streams are traced to their sources and seven large and small glaciers are shown.

PACIFIC OCEAN.—Cruises of the Magnetic Survey Yacht *Galilee* from August 1, 1905, to Sept. 1, 1907. Mercator Projection. *Year Book* of the Carnegie Institution for 1907. Washington, D. C., 1908.

Illustrate Dr. Bauer's Report for the Department of Terrestrial Magnetism. The total length of the three cruises shown on the map is about 50,000 nautical miles.

WORLD.

WORLD.—Trans-Pacific Longitude Connections. In *Transactions and Proceedings* of the New Zealand Institute, Vol. 39, Wellington, 1906.

Accompanies a paper by Dr. Otto Klotz on "Transpacific Longitudes." The completion in 1902 of the cable which bound Australia, New Zealand, and the Pacific Islands with Canada united, for the first time, the longitudes brought eastward from Greenwich and those brought westward, and completed the first astronomical girdle of the world. On the map the cables forming parts of the girdle are coloured according to nationality.

WORLD.—Tektonische und Seismologische Übersichtskarte der Erde. By Prof. Dr. Fritz Frech. Mercator Projection. Justus Perthes, Gotha, 1907.

Illustrates Dr. Frech's paper "Erdbeben und Gebirgsbau" in *Petermanns*

Mitteilungen, No. 11, 1907. The sheet contains two maps. The first, "Gebirge und Meerestiefen der Erde," shows the directions of the young and old mountain chains, the great lines of faulting and sea depths. The second, "Die Verbreitung der Erd-und Seebeben," indicates the distribution of earthquakes in 1907, the disturbances being differentiated according to their strength, and numerals showing the number of earthquakes recorded in these areas in 1899-1903.

BOOK NOTICES.

Natives of Australia. By N. W. Thomas. xii and 256 pp., 32 full-page Illustrations, Map and Index. London, Archibald Constable & Co., 1906. (Price, 6s.)

British North America. 1.—The Far West, the Home of the Salish and Déné. By C. Hill-Tout. xiv and 254 pp., 33 full-page Illustrations, Index, and Map. Archibald Constable & Co., London, 1907. (Price, 6s.)

The Natives of British Central Africa. By A. Werner. xii and 294 pp., 32 full-page Illustrations, Glossary, Index, and Map. Archibald Constable & Co., London, 1906. (Price, 6s.)

Natives of Northern India. By W. Crooke. xiv and 270 pp., 32 Illustrations, Bibliography, Index, and Map. Archibald Constable & Co., London, 1907. (Price, 6s.)

These are the first four volumes of a series published under the general title of "The Native Races of the British Empire," intended to supply to the ordinary reader, in a form neither technical nor bulky, the information he would like to have about these races. Anthropological experts are studying more and more closely every year these peoples in the lower stages of culture, but little has been published about their lives that meets the need of that part of the public who would like to know something of them without digging the facts out of technical works. Most of the contributors to the series are persons acquainted with the peoples of whom they treat, and the preface assures us that in other cases "No statement will be made for which good authority cannot be cited, though, in the interest of the general reader, the text will be unencumbered with foot notes."

The books do not claim to be exhaustive and there is no attempt to give complete bibliographies, although some of the volumes have many titles in their bibliographical lists. The books are certainly adapted to meet a popular need and the special training and studies of the writers qualify them to make a popular exposition relating to these numerous tribes. The illustrations are abundant and excellent.

Mr. N. W. Thomas, the editor of the series, has written the "Natives of Australia," which is a well balanced collection of information on a subject that is still involved in much perplexity. The *Scottish Geographical Magazine* (June, 1907) says that Mr. Thomas is now preparing a larger work on the

aborigines, for which he invites the assistance of those who have special information on the subject. In the present volume he gives in readable form the leading facts now known as to the antiquity, origin, development, history, and customs of the Australians.

In Mr. Hill-Tout's volume on the Indians of western Canada he deals with two clearly defined linguistic stocks, the Salish and the Déné, scattered over the vast area between Hudson Bay and the Pacific. The author shows how difference of climate has produced diversity of development so that the Pacific coast Salish differ much in their mode of life from the interior Salish, the latter much resembling the Déné, who live to the east of the Rocky Mountains. All the main features of native life, houses, clothes, food, domestic and war instruments, customs at birth, courtship, marriage, and death, social organisation, and religious beliefs are well described. The volume concludes with this significant generalisation concerning the Indians before they were touched by white influences:

> The life, then, of an average Western Indian, as it was lived in the earlier days, was not that of a vicious or degraded savage. He had advanced many stages beyond this when we first came into contact with him, and his life, though simple and rude, was on the whole well ordered and happy; and if his wants and aspirations were few, so also were his cares and worries.

Mr. Werner's volume on "The Natives of British Central Africa," dealing with the natives of the British Protectorate, opens with a very satisfactory account of the geography, flora and fauna of this region, describes the six great tribes that inhabit it, and gives a general account of their tribal organisations, religion, languages, arts and industries, and very many phases of the native life. It is an excellent summary of these peoples and of the geographical environment that influences them.

Mr. Crooke, in the "Natives of Northern India," describes their environment, race types, social and industrial life and religious beliefs. He makes clear the fact that the area and population of this region are so great that in dealing with the inhabitants it is necessary to avoid general statements as far as possible. "The Punjabi stands to the Bengali much in the same relation as Scotsmen to Italians; they differ one from the other in race, character, language, and social institutions."

A Trip to the Orient. The Story of a Mediterranean Cruise. By Robert Urie Jacob. vi and 392 pp., Illustrations. The John C. Winston Co., Philadelphia, 1907.

A narrative of globe trotting that has its own claim to attention. It is the simple story of experiences on a tourist excursion to the Orient conducted by one of the large steamship lines which engage in this business. The voyagers were a congenial party and pleasant acquaintanceships were formed during their perambulations from Gibraltar to Palestine and from Karnak to Naples. It differs from the usual tourist book because it treats on the whole of a large party and their experiences. Doubtless many will be interested in such a record of what one may expect to get in entertainment and edification on these attractively advertised excursions. A novel feature is the artistic photographs, nearly 200, made by amateur photographers in the party. In nearly every picture we see many of the tourists amid striking surroundings. They certainly have every appearance of enjoying themselves. It is a readable and entertaining book.

Chinese Thought. An Exposition of the Main Characteristic Features of the Chinese World-Conception. By Dr. Paul Carus. Being a continuation of the author's essay "Chinese Philosophy." iii and 195 pp., many Illustrations, and Index. The Open Court Publishing Company, Chicago, 1907. (Price, $1.00.)

In this suggestive and philosophical work, Dr. Carus supplies material for a psychological appreciation of the Chinese. He sketches the most characteristic ideas that dominate Chinese thought and inspire Chinese morality. He begins with the study of the earliest modes of thought—communication among primitive folk in different parts of the world and traces the growth of the present system of Chinese caligraphy. Oriental, mystical ideas are explained, as well as the popular methods of divination by means of trigrams and the geomancer's compass. A special chapter is given to the zodiacs of the different nations, which are compared with the Chinese zodiacs and the possibility of a common Babylonian origin is suggested. This chapter is illustrated with many rare engravings representing almost all known zodiacs from those of Egypt to those of the natives of the Western world. The influence of Confucius is discussed and a concise recapitulation of the leading facts in Chinese history is given, together with a review of the long novel which takes the place of a national epic. The volume concludes with the consideration of Chinese characteristics and social conditions, the influence of Christian missions, and the introduction of Western commercialism.

Chinese Life and Customs. By Paul Carus. vi and 114 pp., Numerous Illustrations by Chinese Artists. The Open Court Publishing Company, Chicago, 1907. (Price, 75 cents.)

This is a unique book. In preparing it Dr. Carus has made the Chinese characterize themselves by word and picture. The volume presents no Western idea of the Chinese: it gives the Chinese view of phases of their life, illustrated by Chinese pictures. The text explaining the pictures is confined to quotations from Chinese literature.

It was a happy thought to tap such sources of information concerning life in China. The idea was suggested to Dr. Carus by a book printed in Japanese, treating of Chinese life and customs under the present Manchu dynasty and published in Tokio. He has selected from that book the illustrations that are of special interest. They are simply outline drawings after the fashion of Chinese art, but they are thoroughly characteristic of the people whom they are meant to portray. The book is divided into chapters on "Annual Festivals," "Industries and Foreign Relations," "Confucianism and Ancestor Worship," "Taoism and Buddhism," "Childhood and Education," "Betrothal and Marriage," "Social Customs and Travels," "Sickness and Death."

The Story of Paris. By Thomas Okey. With Illustrations by Katherine Kimball. xv–448 Ill., 64. Map of walls, Plan of Paris. J. M. Dent & Co., London, 1906. (Price, $1.50.)

To compass within one small volume the office of historian and cicerone is the difficult task undertaken by our author. Inevitably he is handicapped from the start by the magnitude of the subject. The story of Paris is the history of France, and a guide to the city must be one for several cities united into one.

The success of the attempt can only be partial, and a high-minded writer can but feel that he is sacrificing his art to the convenience of the public.

To condense a hundred interesting facts into one clear, sparkling paragraph is the gift of but few and this author is not one of the elect. But that he is painstaking and accurate there can be no doubt. He has "torn the heart out" of numerous historic documents, but as literature his history is dry and as history it is inconclusive. We feel as if we were grasping at premises which just elude us. That the author feels this vagueness himself is shown by his frequent reference to special authorities.

There are certain chapters, however, which are thoroughly satisfactory: as, for instance, those entitled "Art and Learning," and "The Massacre of St. Bartholomew." But on the whole, it seems hardly fair to criticise censoriously as literature a work which so well performs its function as guide. While raised by its scholarship far above the plane of the ordinary guide book, nothing is omitted that conduces to its value as a trustworthy aid to viewing Paris, old and new. The old streets and historic locations are pointed out, and the ancient edifices described, any curious or interesting event connected with either being recounted.

In addition, the chapters are clearly headed, the index is exhaustive, and the illustrations, whether as prints of old structures, or as reproduced photographs of famous pictures, are beautiful.

By virtue of its workmanship this volume can be recommended as well to those who would know Paris, as to those who already know and love her.

H. P. L.

Les lacs des Hauts Plateaux de l'Amérique du Sud, par Le Dr. M. Neveu-Lemaire, Professeur agrégé à la Faculté de Médecine de Lyon, avec la collaboration de MM. A. Bavay, E. A. Birge, E. Chevreux, G. Marsh, J. Pellegrin, et J. Thoulet. H. Le Soudier, Paris, 1906.

The French Scientific Commission that was sent to Bolivia in 1903 is publishing little by little the results of its labours in various branches of investigation. The present volume is devoted specially to the hydrography of the Bolivian elevated tableland, which extends between the Coast-Cordillera on the west and the Andes or Royal-Cordillera on the east, Southeastern Peru on the north and the mountains about Potosi and Cochabamba on the south. Very little of Peru is embraced within that area, and it would have been more precise, on the part of the author, to have indicated in his title: "The high plateau of Bolivia" instead of "The high plateaux of South America" in general. The title is, so far, misleading.

The expedition landed on the Chilian coast May 18th, starting thence for the interior, and left Bolivia about the middle of August, arriving at Bordeaux October 30th. Thus the commission consummated its labours on Bolivian soil in not quite three months; rather a short time, but well employed, and during which period the Government of Bolivia (especially the Minister of Colonies and Immigration, Don Manuel Vicente Ballivian) and the authorities of the different railroad-lines in operation and in construction afforded every desirable facility. For the exploration of Lake Titicaca one of the lake-steamers was placed at their exclusive disposal.

It is well known that the principal hydrographic features are two lakes, situated at an altitude of over 12,000 feet and for which no common outlet has been yet discovered. Subterranean outlets have been repeatedly supposed, but

none have so far been found. As the level of these lakes, while apparently almost stationary, is still and has been since time immemorial slowly sinking, Dr. Neveu-Lemaire ranges himself with the opinion of others in attributing the shrinking of the watery expanses to evaporation in excess of the supply through affluents. He enumerates twenty-five tributaries of Lake Titicaca, but omits to say that the supply furnished by these is insignificant during a part of the year and that only a few of them deserve the name of rivers, the great majority partaking of the character of irregularly periodical mountain-torrents. He qualifies the water of Lake Titicaca as "fresh" and quite palatable; people who have resided on the shores and islands of that lake much longer than the French Commissioners have always found it slightly brackish and not agreeable.

The two lakes are the Titicaca in the north, by far the larger and partly pertaining to Peru, and in the southwest the lagoon of Poopó, a shallow pond surrounded by a broad swamp belt. Dr. Neveu-Lemaire began his investigations with the latter, which, as he came from Chile (Antofagasta) was naturally the first he reached. He employed in all a week in direct study of the water-sheet, and he gives the results of his observations in a number of tables, some maps, and a number of small, but handsome, photographs. He found the waters of the lake decidedly unpalatable, owing to brackishness. Analyses of the water show enough salts of potash and soda to render it (as Dr. Neveu-Lemaire states) fit for therapeutic purposes, to which the presence of traces of lithia may still further contribute. The temperature of the water was found to vary between 32° F. and about 67° F., according to the time of the day. The depth nowhere exceeded ten feet and the land around is covered with an alkaline crust.

Lake Poopó has no known outlet, but the waters of Lake Titicaca empty into it through the channel of the Desaguadero, running from north to south for a distance of not quite 200 miles with a sluggish current.

Twenty-five days sufficed to Dr. Neveu-Lemaire for his work on Lake Titicaca, which he circumnavigated in the steamer *Yavari,* visiting several points on its shores and a few of the principal islands, measuring its depth at various places, the temperature of the water, its transparency, etc., etc. His figures about the dimensions of the lake are given as approximations, which need not surprise us, taking into account the extreme irregularity of the shore-line and the short time devoted to observation. He gives the surface of the water-sheet, apart from that given of the islands, at 5,100 square kilometers, which is more than Markham's estimate and less than those of most other writers on the subject. In length and width he does not differ much from those of Raimondi and Markham. He enumerates carefully all the sinuosities of the shore line, like peninsulas, promontories and capes, designates nearly every bay and inlet, strait or channel, and gives a fairly complete list of the numerous islands. Descriptions of the latter are meagre, although it may be acknowledged in explanation that water, not land, was the object of investigation. His measurements of the depths agree well with the results obtained by Agassiz and, like the latter, he found the deepest soundings along the eastern (properly northeastern) shore. Where Agassiz found the maximum depth to be 256 meters Dr. Neveu-Lemaire obtained in the vicinity 272, and he, like other serious students, discards the extravagant statement of nearly 1,800 feet made by Wiener. The bottom of the lake was dredged in various places, which yielded interesting zoological specimens and furnished opportunity for the chemical analysis of the bottom deposits. The temperature of the water was determined to the greatest depth observed (272 M.), and a small dif-

ference appears between the surface and the greatest depths; the latter showing a slight increase in heat. The mean temperature of the water would be 50° F., always on the assumption that the scale used by Dr. Neveu-Lemaire is centigrade, which is not stated, but is most probable. His observations of the air temperature are of small value, being confined to a single month of the year. Waterspouts, of which he mentions but one as having occurred within the last thirty years, are not as rare on the lake as he supposes, and sometimes more than one have been seen together; neither does he mention the frequent appearance of St. Elmo fires on masts during the stormy months.

True to his special subject, the author refers but incidentally to the terrestrial fauna and flora, whereas on the aquatic animals and plans he is very detailed. Except the very numerous birds, most of the species are treated in a monographic way and well illustrated.

Dr. Neveu-Lemaire adheres to the theory that the actual extent and condition of both lakes are due to long continuous subsidence, and there is much to be adduced in favour of this almost generally admitted view. Whether the upheavals of carboniferous strata on the peninsula of Copacavana and on Titicaca Island, which reappear on the eastern side of the lake beyond the deep trough along the Bolivian shore, and the trachyte appearing in company with carboniferous strata and Permian sandstone had any great influence on the shape and extent of the great lake is not for the hydrographer to determine.

A number of maps, mostly reproductions of older cartographic material, are scattered through the volume. The author modestly gives them a value equal to that of his own charts. The latter, however, are superior in many ways. In general, he is of the greatest fairness towards all his predecessors and he specially extols the labours of Pentland and Agassiz, the results of which show mostly a gratifying concordance with his own.

That his geographical nomenclature and the spelling of Aymara words in general are often inexact is one cause for reproach. It is so difficult to capture Aymara pronunciation and render it accurately in a graphic way that, considering the short stay of the expedition in Bolivia, it was impossible not to fall into a great number of errors. A. F. B.

Die Küstenbewohner der Gazellehalbinsel (Neupommern-deutsche Südsee) ihre Sitten und Gebräuche unter Benutzung der Monatshefte dargestellt von P. A. Kleintitschen. viii and 360 pp., many Illustrations, and 2 Maps. Herz-Jesu-Missionshaus, Hiltrup bei Münster, 1907.

Missionaries have a most favourable opportunity to become intimately acquainted with primitive peoples because they learn their languages and live among them. This volume is written by a missionary who, in addition to his own observations, used in preparing the book the articles bearing on the inhabitants of the Gazelle Peninsula which have been appearing for the past twenty-five years in the monthly publication of the Herz-Jesu-Missionshaus. The book tells of the discovery of this region and sketches its geography, climate, plant and animal life, and volcanic and seismic phenomena. Sixteen chapters are devoted to the natives in many phases of their lives. Numerous photographs show their industries and specimens of their handiwork, and illustrate the influence of the whites who maintain schools and in other respects are modifying the condition of the aborigines.

Die Mythen und Legenden der Suedamerikanischen Urvoelker und ihre Beziehungen zu denen Nordamerikas und der alten Welt. Von Dr. Paul Ehrenreich. A. Asher & Co., Berlin, 1905.

This is not the place for a detailed criticism of a publication so strictly ethnologic and ethnographic. The author, well acquainted with the Indians of Brazil and their lore, shows himself very poorly equipped for a discussion of the myths and traditions of the rest of the American continent, so that his generalizations and conclusions, while often plausible, lack the support of an adequate foundation. The subject is a very vast one, and it becomes more and more complex through constant additions to our knowledge by actual observation and the unearthing of new literary sources from former times, when more vestiges of primitive culture were yet extant. Dr. Ehrenreich in undertaking a comparison between the myths from the various parts of America has shown much good-will but, owing to his deficient knowledge in many parts of his subject, he leaves the impression of hastiness and superficiality.

The time has not yet come when the myths and traditions of all the American aborigines can be satisfactorily compared and any attempt at encompassing the whole field is premature. A. F. B.

Turkey and the Turks. An Account of the Lands, the Peoples and the Institutions of the Ottoman Empire. By W. S. Monroe. xvi and 340 pp., 46 Illustrations from Photographs, Appendices, and Index. L. C. Page & Co., Boston, 1907.

The author is Professor of Psychology and Pedagogy in the State Normal School at Westfield, Mass. The first chapter gives a clear statement of the structure and geography of the Balkan Peninsula. Two chapters treat of the rise and decline of the Ottoman Empire; another follows on the significant events of Turkish history in the past 30 years and then 17 chapters, including 8 on Constantinople, are devoted chiefly to the human phases of Turkey. At the end of the volume are suggestions to travellers, a bibliography with critical remarks, and a good index. The style is vigorous, the descriptions are full of matter, the author is reporter, commentator and critic, and his work is very readable.

There are sections on the origin of the Osmanli Turks, the diversity of races and their characteristics, polygamy and other social phases, the Ottoman Government and its relation to the faith of Islam, education, agriculture, commerce and communications. The chapters on Constantinople are finely descriptive. One of them is devoted to the present Sultan depicted in his lights and shades. The book is thoroughly useful, and is all the better for having been written by an educator who knows the value of careful and accurate statement.

Blicke in die Geisteswelt der heidnischen Kols. Von Ferdinand Hahn. Gütersloh: C. Bartelsmann, 1906. 116 pp. (Price, M. 1.50.)

Mr. Hahn who, for forty years, has been a German missionary in India, especially among the Kols, a tribe in the Vindhya Mountains subjected by the Hindoos, is the author of the first grammar and dictionary of the language of the Oroan-Kols which, unlike that of the Mundu-Kols who surround them, is of Dravidian origin. These two fundamental books were published by the English Government as aids for their officials in the study and management of the natives, and being the first foreigner capable of understanding and speaking their language Mr. Hahn gained the confidence of these primitive people in a higher

degree than any one else before him. They freely told him a great many of their fairy tales, legends, and songs, which had never been imparted to outsiders. He had them written down in the vernacular by his native assistants and, in order to ascertain that their rendition was in every way in accordance with the spirit of the subject, had them written over again in Hindustani. With these two versions as a basis he undertook the publication in the vernacular which was, in its turn, printed at the expense of the Government to serve its officials as a reader of that language and an introduction into the understanding of the character of their subjects ("Kurukh Folk Lore in the Original"). In this German edition of the more important of these stories, the author presents them, for the first time, to readers of the Western world. They contain a great amount of pleasant reading, much of which would amuse children as European fairy tales do, and like these they are full of facts of a very high value for the ethnologist. It is especially interesting to observe certain similarities with Western folk lore and biblical traditions, such as the cunning of the fox, the creation of man, the survival of two people after one great cataclysm (in this case a conflagration), and the like. The author has accomplished a very meritorious task in making this folk lore accessible to Western scholars, and he ought to be thanked especially for the simple, truthful way of his reproduction, which is nowhere tainted by the additions and implications which jeopardize the scientific value of many publications sent forth from missionary circles.

M. K. G.

The Todas. By W. H. R. Rivers. London: Macmillan & Co., 1906. 755 pp. (Price, $6.50.)

To the comparatively extensive literature on that isolated tribe of the Nilgiri Hills, the Todas, the author has added, by this book, a wonderful amount of new information on their religious and social institutions. The most striking feature in the daily life of the Todas is the prominent place occupied in it by the buffalo. The care and culture of their buffaloes are associated with much ceremonial, and the milking and churning operations of the dairy form the basis of the greater part of their religious ritual. With the Todas, a priest is a man especially set apart for attending those buffaloes, and their temples are the dairies in which the milk of the sacred animals is churned. Every operation of the dairy has thus become a religious act, and every incident in the lives of the buffaloes a pretext for religious ceremonial. There are various degrees of sanctity among the buffaloes, and the dairies where they are kept form, accordingly, an ascending series with increasing complexity of ritual, and increasing sanctity of the priest-dairyman. The author describes in detail the various acts and stages of this complicated ritual, both with regard to the operations of the dairy and the lives and duties of the priests. The present state of the Toda religion seems to be one in which the ritual has outlived the beliefs which once were at the bottom of it. This is, probably, an effect of seclusion. Contrary to other tribes in more accessible regions, where contact with the outside world and especially with Christian missionaries has attacked and more or less destroyed the ancient forms of worship while the people cling so much more tenaciously to their old traditions, the Todas have in their isolation preserved only the visible forms of their beliefs, the ceremonial, and lost the origin and true significance of the same. Most of their individual gods have thus become very unreal beings to them; they have certain vague ideas about certain gods as the

authors of punishment, but the attitude of worship is apparently in a state of transition from the gods themselves to the material objects used in their service; buffaloes, dairies, bells, etc. Even the ritual, the author observed, has suffered from this changed attitude toward its meaning. It is often carried out now less conscientiously than in former times, and almost casuistical syllogisms are used in some instances to avoid its requirements. The Todas, in fact, "show us, in little, the general traits characteristic of the degeneration of religion."

A study of the social customs of the Todas is a study in polyandry. When a woman marries a man she becomes the wife of his brothers at the same time. The problem of fatherhood is settled in a very simple and original way. When a woman is pregnant with her first child the man who is going to assume the duties of father performs with her a ceremony called *pursütpimi,* the main feature of which consists in his offering her a bow and arrow. From that time on he is considered the father, not only of this child, but of any future children the woman may have, unless another man performs the *pursütpimi* during a later pregnancy by which fatherhood, for all legal and social purposes, is transferred to him with regard to the child about to be born as well as those who may follow. On the other hand, marriage is subject to a considerable number of restrictions. A fundamental one is the law against intermarriage between the two principal divisions of the Todas, the Tarthar and the Teivali, and to a lesser degree between members of their own clans within these divisions. The prohibition of marriage does not, however, include prohibition of sexual intercourse; for, besides her husbands, a woman may be united by the *mokhthaditi* union to another man, as a rule, one of the opposite division. This *mokhthodvail* is a recognized lover, with the consent of her husbands, but he has no rights over any children that may be his, as all the woman's children are legally and socially those of her husband, viz., the man who performed the *pursütpimi* on her. Likewise the children, even those of the *mokhthodvail,* belong to the clan of their legal father in the same way as the mother has, by her marriage, become a member of that clan, even if the lover should be dead or live separated from the mother. If the *mokhthodvail* is a Tarthar and the woman a Teivali she may go and live with him at the Tarthar village; but in the opposite case, the Tarthar woman must not follow her Teivali *mokhthodvail* and he is allowed only to visit her at her husbands' house. The details of these relations furnish interesting problems to illustrate Mucke's "avunculate."

Another restriction placed upon marriage is that given by the *püliol* relation, viz., forbidden bloodkinship, the foremost of which is that a man must not marry the daughter of his father's brother or of his mother's sister. On the other hand, the orthodox marriage is that with the daughter of his father's sister or his mother's brother, called *matchuni.* The *matchuni* is always the first husband of a girl, the marriage generally being contracted in infancy. If, among the adult couples, marriages between *matchuni* do not appear as frequently as ought to be expected from this custom it is due partly to the loss by death of the *matchuni* after which another marriage was contracted, partly to the custom called *tererstthi,* which consists in the transfer of a wife from one husband to another, so that the remaining together of a couple united in infancy is the exception rather than the rule. The strictness with which the *matchuni* is bound to be the first husband of the girl is perhaps most strikingly illustrated in the fact that, when a girl dies unmarried, her *matchuni* has to perform by the dead body the *pursütpimi* ceremony.

It seems as if more recently the polyandric institutions were showing a tendency to become combined with polygyny. The author observed several instances where two brothers had two wives, instead of one, each of them being evidently the wife of both, but what he saw of it was not found sufficient to serve as a basis for generalisations. In this instance, as everywhere throughout the book, the author shows himself in possession of that rare ability not always found with ethnological writers of distinguishing between the facts observed and his, or his interpreters', interpretations of the same. In every line of the book we can tell exactly what he saw, or what he considers to be based on sufficiently trustworthy report to be offered as facts, or what are hypotheses still wanting further investigation. The book would be perfectly admirable merely for the sake of this clear distinction between fact and theory, even if it were not so for the astonishing mass of material that it places at our disposal. No better instance of the thoroughness that characterises the author's proceedings can be mentioned than the 72 genealogical tables of Toda families, comprising almost all of the 800 people that compose the tribe, which form the basis of his explanations of family law, and which are in themselves one of the most valuable documents ever furnished to ethnology. M. K. G.

The Geology of the Parapara Subdivision, Karamea, Nelson. James Mackintosh Bell, assisted by Ernest John Herbert Webb and Edward De Courcy Clarke. Bulletin No. 3 (New Series), New Zealand Geological Survey. Wellington, New Zealand, 1907.

The newer regions of the world are geographically interesting for two chief reasons. In the first place, the great development in recent years of land form description and analysis has bred a strong desire to see in how far the systematic nomenclature is applicable to the newer and hitherto scientifically undescribed lands. Each new exploration, each new description, is a matter of consequence, as it tests the reliability and fitness both of our physiographic vocabulary and, among other things, of our modern view of uniformitarianism as applied to the origin and development of land forms

These new studies are of interest, in the second place, because they increase our knowledge of the limits of the material resources available to man. Upon this second point depends a whole train of geographic circumstances, for the resources of the earth are a very large part of that total environment which conditions and therefore explains man's activities and welfare. The progress of nations and even races and the nature of their relations are very closely associated with the material resources of the lands they occupy. Furthermore, and in so far as geography is a study of distributions, the occurrence and future discovery of material resources is a matter of great moment, because it constitutes the chief reason why the populations of the earth are distributed as they now are and why profound changes in present distributions may be expected in the future, with the opening up of new sources of wealth.

It is for these reasons that the report before us, though primarily economic and geologic, is also of geographic interest. It deals with the limits of resources in the area considered and presents clear descriptions of physiographic types. These two phases of the report will be briefly set forth as follows:

The main physiographic features of the Parapara area, the most northerly part of the South Island of New Zealand, are: (1) a mountainous old land, (2) uplands representing faulted blocks of an ancient coastal plain, and (3) the

modern coastal plain, formed for the most part by the flat lower courses of the streams and the confluence of their deltas along the littoral.

The old land consists of ancient (early Paleozoic) schists, phyllites, quartzites, carbonates, grauwackes, and the like, and intrusive igneous rocks included in them. These have been profoundly disturbed by regional crustal deformation. The old land represents an ancient mountain range once maturely dissected and now occupying its comparatively great elevation, not so much on account of its original folding as on account of broad secular upwarp in relatively recent geological time. One sees generally in this province the rounded outlines so characteristic of elevated land surfaces subjected previous to the last uplift to long-continued subaerial erosion. South of this province the rounded outlines are lost on account of the greater dissection of the old surface and the fissile character of the strata.

The uplands fronting the old land are represented in part by flat-lying or gently dipping Miocene strata, in part by truncated and steeply inclined older strata, the latter a sea terrace upon which the Miocene deposits were originally laid, but from which they have since been stripped by normal erosion. At the inner edge of the uplands area (2,000 feet A. T.) the general continuity is broken by narrow water-courses. Toward the outer margin there are spacious floodplains bordered by outliers of the uplands or by terraces cut in horizontal strata.

The modern coastal plain has a patchy development occurring chiefly at the mouths of the principal streams. It owes its character presumably to the slight modification of ordinary deltas whose confluence with each other and with the floodplains already noted yields a low and narrow coastal plain of recent development. The ultimate cause for the origin of the coastal plain is to be found in the post-Miocene uplift which functioned the present wide dissection of Miocene strata and their redeposition as recent deposits at the present lower level. The regular shore features are those appropriate to coastal plains of recent origin. Low sand reefs enclosing small lagoons occur on the outer fringes of the deltas at high tide, while at low tide the streams discharge over wide mud flats in numerous distributaries.

The point of principal interest in connection with the resources of the region relates to the utilization of the remarkable deposits of iron ore which occur in such great quantities. The ore is of high average quality and well suited for the manufacture of iron and steel. A single one of the three blocks of iron ore in the region, the Washbourn block, is estimated to contain over 22,000,000 tons of ore. Furthermore, these deposits are all in highly accessible localities,—nowhere more than a few miles from the seashore. Their occurrence at the surface is another important favouring circumstance, as it would enable quarrying on the cheap open-cut system. The only unfavourable condition is the scarcity of fuel in the immediate vicinity of the deposits. However, the occurrence of high-class coal 145 miles away by sea would seem to enable the acquisition of fuel at a cost consistent with the profitable undertaking of extensive metallurgical operations.

The author points out that the world's supply of high-grade iron ore is rapidly decreasing, owing to the enormous annual production of iron necessitated by modern methods of construction. He reminds us that, according to the estimation of very good authorities, the world's visible supply of high-grade ore suitable for manufacturing purposes will be exhausted within fifty years at the

present rate of consumption. The day does not seem distant, therefore, when these vast New Zealand deposits of high-grade ores will be appreciated and their utilization begun. I. B.

The Oceanic Languages, their grammatical structure, vocabulary and origin. By D. Macdonald, D.D., of the New Hebrides Mission, member of the Société d'Ethnographie, Paris. Henry Frowde: London, Edinburgh, Glasgow, New York, and Toronto, 1907. Pp. xv, 352, and two maps.

Not in the slightest degree indicated upon the title of this long-awaited contribution to our knowledge of the Western Pacific, the really important fact is that this work consists of a grammar and dictionary of the language of Efate in the New Hebrides. The author in his preface calls it in so many words "a complete dictionary of the language"; with more precaution and greater precision we may note from actual tally that the dictionary contains 3,657 entries. At last we have our first dictionary of any Melanesian language, the Fijian so interestingly recorded in Hazlewood's dictionary being a mixed speech in which the Polynesian element is preponderant. It has been a long wait. We have a Hawaiian dictionary published at Lahainaluna in 1845. Since that time the life of a man has passed before Melanesia receives something better than brief and irregular word-lists scattered through fugitive publications. Dr. Macdonald has been at work upon his task for thirty-five years, and he may well be proud that he has witnessed the production of this, the third and crowning volume of his studies upon the New Hebridean languages, the former volumes having been published in Melbourne in 1889 and 1891 at the charges of the Colony of Victoria, and the volume now in hand similarly appears through the generous liberality of the Commonwealth of Australia. We feel sure that Dr. Macdonald's admirably urged theory of the Semitic origin of the Malayo-Polynesian (including therein the Melanesian) will not be passed without a vigorous challenge from the philologists who specialize in that speech family or families. Yet even should the theory be overset and the comparative philological apparatus through which it is developed be cast aside as lumber, that does not in the least affect the value of the dictionary as our first vocabulary of Melanesian speech. The first ordered investigation of the complex of tongues in the western archipelagoes of the South Pacific was made by H. C. von der Gabelentz upon unfortunately scanty and not always accurate data and was published in 1861, when Dr. Macdonald was entering upon that life work so properly crowned with the bays by this monument of his own erection. Since then the only considerable addition has been Codrington's "Melanesian Languages" (1885) and that pretends to no more than comparative grammar. Our author has now produced the first dictionary, given us the first codified data, and thereby has made it possible to give intelligent study to the various scattered lists of words of the island area from New Caledonia to New Guinea. W. C.

Die Gletscher. Von Dr. Hans Hess, Königl-Gymnasial-Professor in Ansbach. With 72 figures (8 full-page half-tones) and four Maps. Braunschweig: F. Vieweg & Sohn, 1904.

The bibliography of glaciers comprises many titles, among which are several books from the times of von Böhm (1770) and de Saussure (1786) to the present day, but for twenty years the student has turned to A. Heim's "Handbuch der

Gletscherkunde" as a storehouse of fact and theory regarding glaciers. The advances, however, in knowledge during the time which has elapsed since the appearance of that book have been so great and so rapid that the appearance of the present work by Hess is a welcome addition to the literature of an interesting and difficult subject. Professor Hess has had wide and long-continued experience in work upon the ice-streams, which has been supplemented by the exhaustive reading characteristic of the German scientist.

The author first discusses with painstaking fulness the physical properties of ice, describing the crystalline form, the modes of occurrence, the "melting figures" of Tyndall, and the constants—plasticity, elasticity and behaviour under stretching and compression—receive particular attention on account of their bearing on the cause and manner of movement in glaciers. Hess, basing his conclusions upon microscopic study, adheres to the old theory that ice under pressure and with freedom to move behaves like wax, an idea that Chamberlin and Salisbury have opposed with the theory that the movement and change of form of the ice are due to sliding of the component crystals one upon another.

In discussing the climate of glacial regions attention is called to the lack of exact observation and measurement of snowfall upon the mountains and in the collecting fields of glaciers. Recent (up to 1903) observations in polar regions are brought together in valuable condensed form. The snow lines of all the glacial regions of the world are given upon an instructive map. It is interesting to note that nowhere in the northern hemisphere does the line of perpetual snow lie actually at sea-level. Even in Jan Mayen (82° N. Lat.) it is about 50 meters above the sea. The highest position of snow-level reported is that of 6,000 meters in the Kuen Lun Mountains in central Asia.

The extremes of the types of form presented by glaciers are the "Alpine" in which the upper surface of the ice is concave as it issues from its collecting ground, and the "continental" in which the upper surface is convex; but there are all kinds of transition forms between the ends of the series. The Alpine type is the more productive of glacier "tongues" extending downward from the ice sheet. The snow line separates every glacier into two parts, that of growth and that of dissipation, and the relation between these zones in the same glacier varies with the shifting of the snow-line—accurate maps, therefore, are of the greatest use to the student of glaciers in making out these relations.

After discussing briefly but clearly the distribution and dimensions of glaciers throughout the world, Professor Hess collects into a table the ice-covered land areas and states that glaciers of one kind and another cover about 15,200,000 square kilometers, or about 3 per cent. of the entire surface of the earth, or 10 per cent. of the land surface. Of course by far the largest part of the glacial coating is in the polar regions, and particularly the south polar (13,000,000 square kilometers). The glaciers of the mountains of the temperate and tropical regions occupy only 70,000 square kilometers, or less than one-half of one per cent. of the whole glacial area of the world. A chapter is devoted to the flow of glaciers, in which it is shown that, while the old method of measurement by means of lines of stones has not been improved upon for rough or average statistics, trigonometric methods can be applied where more exact work is demanded. Such methods have added much to our knowledge of the variation of the velocity of glacial movement with the breadth and depth of the ice-mass, with the inclination of the bed and in different parts of the length. The many tables given in this discussion compiled from the author's own observations and

other sources are noteworthy. Many close analogies are pointed out between the flow of the ice of a glacier and that of the water of a stream.

Professor Hess contends that the whole complex structure known as the banding of a glacier merely expresses the stratification produced in the snow of the firn field, as modified by the changing circumstances of the glacier's bed. The chapter on the effects of the ice upon its rock bed shows that the author does not agree with those who have been trying to prove, of late years, that glaciers are weak and inefficient instruments of erosion.

A simple and condensed scheme of classification of moraines is presented, which may be translated as follows, the terms being fairly self-explanatory:

- Moraines
  - Transported moraines
    - Surface moraines
      - Side moraines
      - Middle moraines
    - Included moraines
    - Ground moraines
  - Lifted or erosion moraines
    - Wall moraines
      - Longitudinal moraines
      - Terminal moraines
        - Border moraines
        - Shoved moraines
    - Ground-moraine-covering.

Annual and secular variations of glaciers receive elaborate attention and Hess discusses at length the effects of climate, holding that differences and changes in climate do not alone account for the advance and retreat of the ice streams. He goes on then to show that the orographic relations of the glaciers have an important influence upon the question. The chapter upon the theories of glacier-movement is comprehensive and illuminating, giving a concise summary of the views of eminent glacialists from Scheuchzer to Forel and Finsterwald, including the mathematical expression given by Finsterwald to the Forel-Richter theory. The author devotes a chapter to the Glacial Period, particularly to the phenomena of that time in the region of the Alps, but with some reference to the remainder of Europe and the world in general. In discussing the causes of this period, Hess defends the idea that glacial periods must have come contemporaneously over the whole earth, and that the Great Ice Period was essentially continuous. After giving briefly the astronomical, geological and physical theories that have been advanced to account for the occurrence of general glacial periods and dwelling particularly upon the theories of de Marchi, Arrhenius and Marsden Manson, Hess concludes his masterly book by saying that the cause of the Glacial Period will be discovered when we have learned the true climate relations of existing glaciers and their action. E. O. H.

Vancouver's Discovery of Puget Sound. Portraits and Biographies of the Men Honored in the Naming of Geographic Features of Northwestern America. By Edmond S. Meany. xvii and 344 pp., Illustrations, Maps, Charts, Appendix, and Index. The Macmillan Company, New York, 1907.

This book is a welcome accession to the library of North American exploration because the author sought unceasingly to obtain new information with regard to the work of Vancouver and his contemporaries from the public and private archives of England and Spain. He has brought together many facts that help to verify or explain obscure or disputed points; has collected the portraits of many men who furthered geographical enterprise on the Pacific Coast, and tells in foot-

notes what each man contributed; gives the origin of many of the coastal place names and prints that part of Vancouver's journal describing the shores of the present State of Washington, Puget Sound and Vancouver Island and the negotiations at Nootka by which Great Britain obtained an acknowledgment of her equal right with Spain to carry on commercial undertakings in those waters.

The book gives throughout a clear and vivid impression of Vancouver himself. He lived only forty years, but his brief life was crowded with achievement. His fame has vastly increased as he has been more carefully and critically studied. His work was accurate and his descriptions give a vivid impression of geographical facts as they are observed to-day. The few lines in which he sketches the appearance of Mount Olympus, for example, give an excellent idea of it as it is seen in its grandeur from the park at Victoria. The author quotes from a letter written to him by Professor George Davidson, who for fifty years was engaged in the Government Survey of the Pacific Coast:

> I have gone over every foot of the work done by Vancouver on this coast and I wish to say that he was a great, big man.

The facts given in the book show that Vancouver was worthy of this encomium from a high authority.

OBITUARY.

Morris K. Jesup.

Mr. Jesup died at his residence in this city January 22, in the seventy-eighth year of his age. He was born at Westport, Connecticut, and early in life established himself as a banker in New York. He retired from business in 1884 and thereafter devoted his time and means to an active interest in educational and benevolent institutions, to private charities, and to enterprises for the advancement of knowledge. He contributed largely to the Syrian Protestant College at Beirut, to Arctic exploration and to ethnological researches in northwestern America and northeastern Asia. He was for many years the President of the Chamber of Commerce and also of the American Museum of Natural History, to which latter institution he bequeathed a fund of $1,000,000—the interest to be applied to the increase of its collections.

Mr. Jesup became a Fellow of the American Geographical Society in 1874 and a member of the Council in 1893.